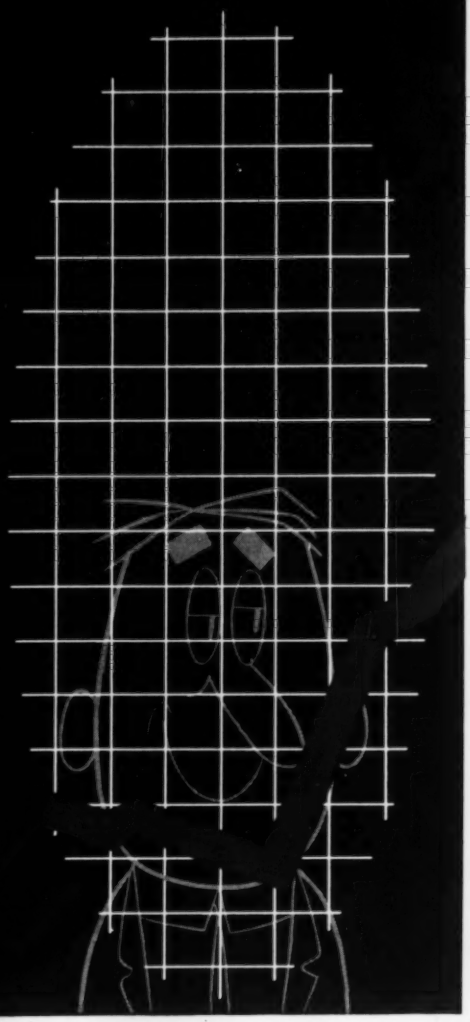
MARCH 16, 1959

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



Improving Productivity

From now on, metalworking managers will have to play the role of productivity experts as never before. Object: To keep inflation from running wild. The second article in STEEL's 1959 Program for Management gives tips on how to play your part . . . Page 103

A PROGRAM FOR MANAGEMENT 1959 . . . No. 2

Page 59 . . .

Recession-Spurred Boom in Steel Imports Keeps Up Pace in 1959

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Why Anaconda Takes on Aluminum

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What's Best Depreciation Reform?

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How To Up Reliability of A-286

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Look for More Use of Electrics In Direct Reduction of Iron Ore

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Special Tubing Prospects Bright

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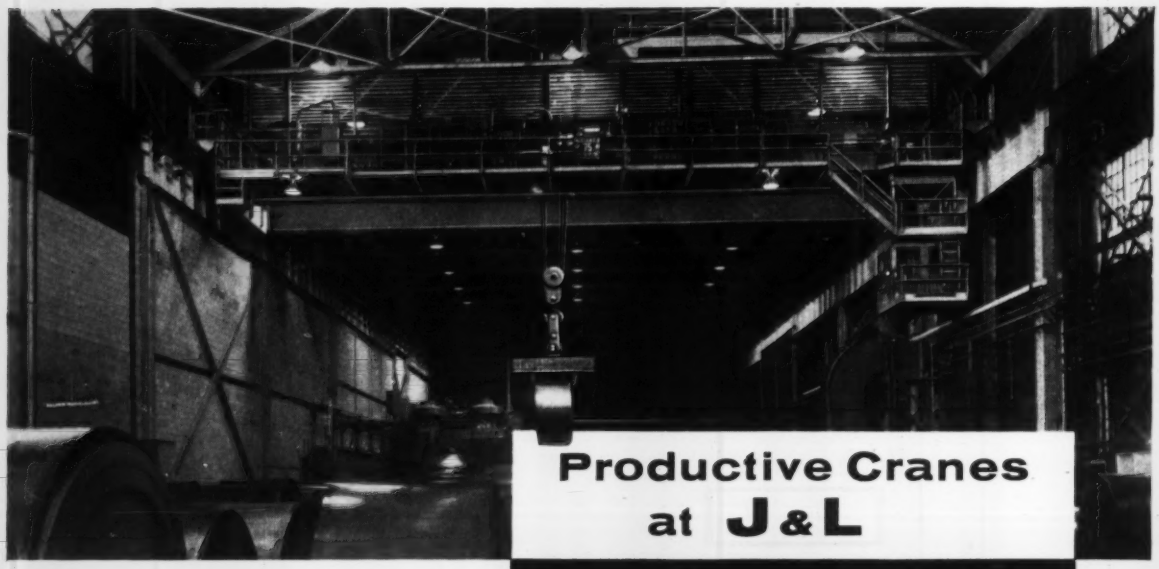
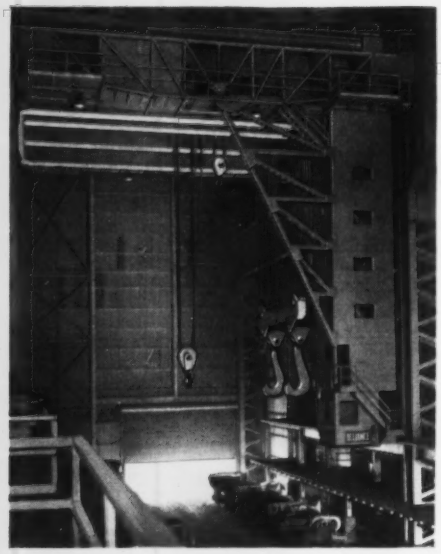


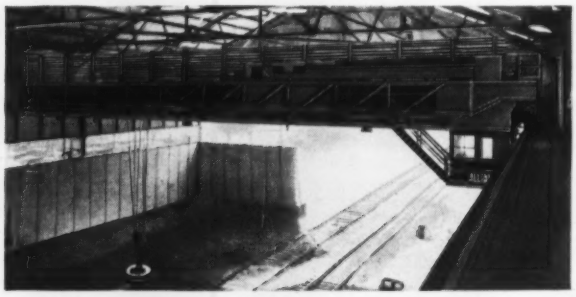
Productive Cranes at J&L perform at top efficiency under EC&M Control



ABOVE • Equipped with EC&M Control, this 200-ton ladle crane will spot heavy loads with "pin-point" accuracy

RIGHT • Stockyard crane, servicing the slab conditioning area, is EC&M controlled

Production cranes, vital to maintained output, receive a big lift when EC&M controlled. Inherent in EC&M Control are the advantages of fast brake release for "pin-point" spotting, quick response to master switch manipulation and maximum safety at all times. Fast-operating LINE-ARC Contactors and Time-Current Acceleration Relays permit cranes to be operated smoothly under any load condition. The well-known EC&M Wright Dynamic Lowering Circuit is 100% safe. When buying cranes, it pays to specify EC&M Control.



For complete facts on EC&M DC Crane Control, write for Bulletin 6100

THE ELECTRIC CONTROLLER & MFG. CO.
A DIVISION OF THE SQUARE D COMPANY
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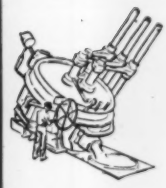


Tool Steel Topics

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

Export Distributor: Bethlehem Steel Export Corporation

TO ALL TOOL AND DIE MAKERS:

BETHLEHEM ANNOUNCES AIR-4, A NEW FREE-MACHINING TOOL STEEL WHICH AIR-HARDENS AT LOW TEMPERATURE STOP AIR-4 HAS EXCELLENT FREE-MACHINING CHARACTERISTICS BECAUSE OF ADDITION OF LEAD STOP OTHER OUTSTANDING PROPERTIES INCLUDE EXCELLENT WEAR-RESISTANCE AND HIGH TOUGHNESS FOR GENERAL-PURPOSE TOOLING STOP AIR-4 IS A DEEP-HARDENING GRADE AND HARDENS AT ABOUT 1550F STOP OTHER ADVANTAGES INCLUDE 1. SAFE HARDENING 2. MINIMUM SIZE CHANGE DURING HEAT-TREATMENT 3. LOW HEAT-TREATMENT COSTS AND MINIMUM DECARBURIZATION STOP

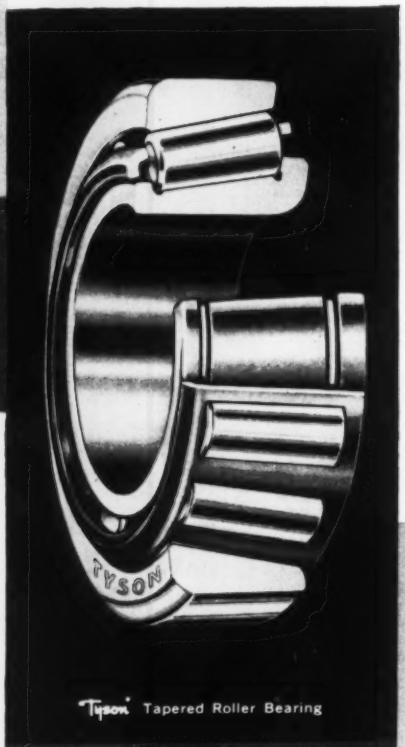
WRITE BETHLEHEM STEEL COMPANY, BETHLEHEM, PA., FOR FULL DETAILS

We make so many sizes... your "specials" could be our "standards"

Angular Contact Bearing

Spherical Roller Bearing

Spherical Roller Thrust Bearing



"Tyson" Tapered Roller Bearing

Single-Row Deep Groove Bearing

Cylindrical Roller Bearing

We regularly produce all of the bearings shown here in a tremendous variety of bores, outside diameters, and widths.

Take just the Tyson tapered roller bearing, for example. We make nearly 1,000 sizes of the single-row, straight bore type alone! Bore sizes range from five-eighths of an inch right up to a precise fourteen inches. And these figures don't include the many other sizes available in our double- and four-row types.

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5921

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EVERY TYPE—EVERY USE

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NATIONAL FORGE COMPANY

IRVINE, WARREN COUNTY, PENNSYLVANIA

For more information on "the tough ones," and the machinery that makes them "best"—write for bulletin NFO

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RIGHT ON THE BUTTON

Are your profits being plucked by short runs or over-runs? You can put everything under *Count*rol — and keep it that way — with Veeder-Root Counters on your machines and processes. For then you can see at a glance exactly where production stands at any given moment.

Veeder-Root makes all types of electrical, mechanical and manual counters . . . including remote indicating units that can be panel-mounted right in your office . . . and predetermining counters that *Count*rol machine-runs. So whatever you need to count, you can count on Veeder-Root to figure the best way to do it.

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This Week in STEEL

The Metalworking Weekly

March 16, 1959
Vol. 144 No. 11

EDITORIAL 57

What price imports? American industry can't compete effectively abroad and is losing markets at home.

SPECIAL FEATURE 103

Coldwater Charlie is only one of eight kinds of "managers" who continually block improvements in productivity. You'll find them all listed in the second article in STEEL's Program for Management for 1959. The article tells about areas many companies are overlooking in seeking to better their productivity.

WINDOWS OF WASHINGTON 68

Change in jobless rate may indicate government action in many areas that could affect your business.

MIRRORS OF MOTORDOM 77

With '59 model run about half over, it looks like output will come close to predicted 5.5 million.

THE BUSINESS TREND 81

Consumers are in excellent position to keep nation's economy on uptrend. Some of the reasons are outlined.

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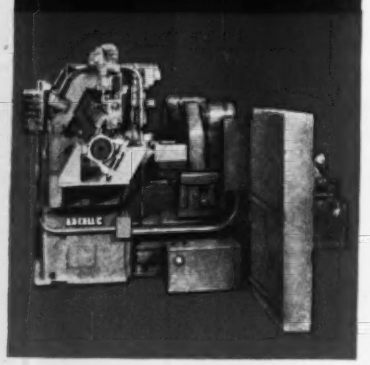
STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $20 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. Published every Monday and copyright 1959 by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio. Accepted as controlled circulation publication at Cleveland, Ohio.

Index available semiannually. STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

Step-by-Step Automation with Ex-Cell-O Specials

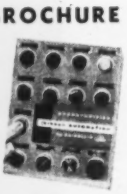


Your first step into automation may cost much less than you think. In medium-sized shops, for example, a profitable, automated set-up may involve the purchase of a relatively simple transfer machine, such as the one illustrated above, consisting of two standard way-type units. Or, even more simply, a single standard machine which easily fits into automated set-ups later on.

In any case, a host of Ex-Cell-O engineers, laboratory technicians and production specialists are at your service. *No obligation whatsoever.* Call your Ex-Cell-O Representative or write Ex-Cell-O, Detroit.

SEND FOR FREE BROCHURE

This 20-page catalog will show you the most profitable way to put automation into your present operations—make your own "Automation Appraisal." Ask for Bulletin 50155.



XLO *EX-CELL-O FOR PRECISION*

57-88

EX-CELL-O CORPORATION DETROIT 32, MICHIGAN

behind the scenes

Metallic Transition

A popular parlor game was revived recently in one of the Sunday magazines. It involves the use of silhouettes of recognizable objects. The silhouette is cut into four or five pieces, and the player is asked to connect them and deduce the picture. A sort of a poor man's jigsaw puzzle.

Lazy writers can play a similar game with words and expressions. Here, for example, are some temporarily disconnected thoughts; let's connect them, shall we, and check the picture?

A couch, mice, high land, banjos, Indians, and palefaces. Now, eune is Greek for couch; murinus is Latin for mouse; and for some ridiculous reason, eunectes murinus is the classy name for a South American anaconda. High land, of course, is Terre Haute; banjos suggest the banks of the Wabash far away, and if Indians suggest copper, palefaces naturally suggest aluminum. The story deduced from this will reveal that the Anaconda Co., long the copper giant of the Americas, has set up shop in Terre Haute, Ind., to produce aluminum.

The complete story will be found on Page 66, which is obviously elsewhere in the magazine; and elsewhere in STEEL, of course, is the logical place to seek information. On this page we can merely stare with wonder at the great copper company, the mighty Anaconda. What a magnificent gesture—to manufacture its own competition! Makes you sit up and take notice, the way you would if Standard Oil were to mine coal.

Improved Profession

When you finish the Anaconda story, turn to the article about traffic managers (Page 74). STEEL says that the time has come to let traffic managers manage; too often, it complains, they're just freight clerks. We asked eight persons for a definition of a traffic manager, and received nine different replies. (One of the respondents, as a result of his legal training, used double talk.) The common impression of a traffic manager is not too flattering. He is regarded as an intellectual character lacking in gumption, the assumption being (say, gumption, assumption! Sounds like a big stone falling into the water, doesn't it?) that he can never overcome the inertia that holds him in his lowly position.

Assistant Editor Derry Eynon, who assembled the traffic manager article, filled us in on his assignment. "You'd be surprised," he said, "at the number of things a traffic manager does. His functions include shipping, tracing, co-ordinating, advising, packaging, personnel, hiring and firing—"

"A traffic manager does all this? Why, it seems his employer is taking advantage of him."

"That's just it; his employer should take advantage of him. He should receive the authority and recognition to do the jobs he can do."

"If he's such a hot shot, why isn't he recognized as such?"

"He is. Out in Terre Haute, Ind.—"

"We were out there a minute ago. That's where Anaconda is making aluminum now, you know. Were you talking to their traffic manager?"

"No, no. Terre Haute is the headquarters of the American Society of Traffic & Transportation. The ASTT examines qualified traffic managers and certificates them. First one they ever certificated was Leonard C. Schmetzer, staff traffic manager of Thompson Ramo Wooldridge, right here in Cleveland, back in 1950. Maybe you better read the story. I'm too busy to —*what* did you say about Anaconda making *aluminum?*"

"In your own words, better read the story."

Detroit Doubter

Exeunt Eynon and enter foxy Don Postma, STEEL's Detroit editor. Donald approaches the footlights, arches his brows until the wrinkles ripple beyond his hairline, and he bellows in a loud voice. "Hulloa, Shrd, thou talkative, evasive dabbler in picayunish prose! What's all this stuff about a National Welded Products Month, with President Eisenhower getting into the act? Detroit Steel would like to build an ad around National Welding Month, but they want to know if April is to be recognized as National Welding Month by everyone or just by Shrdlu. Speak up, sirrah!"

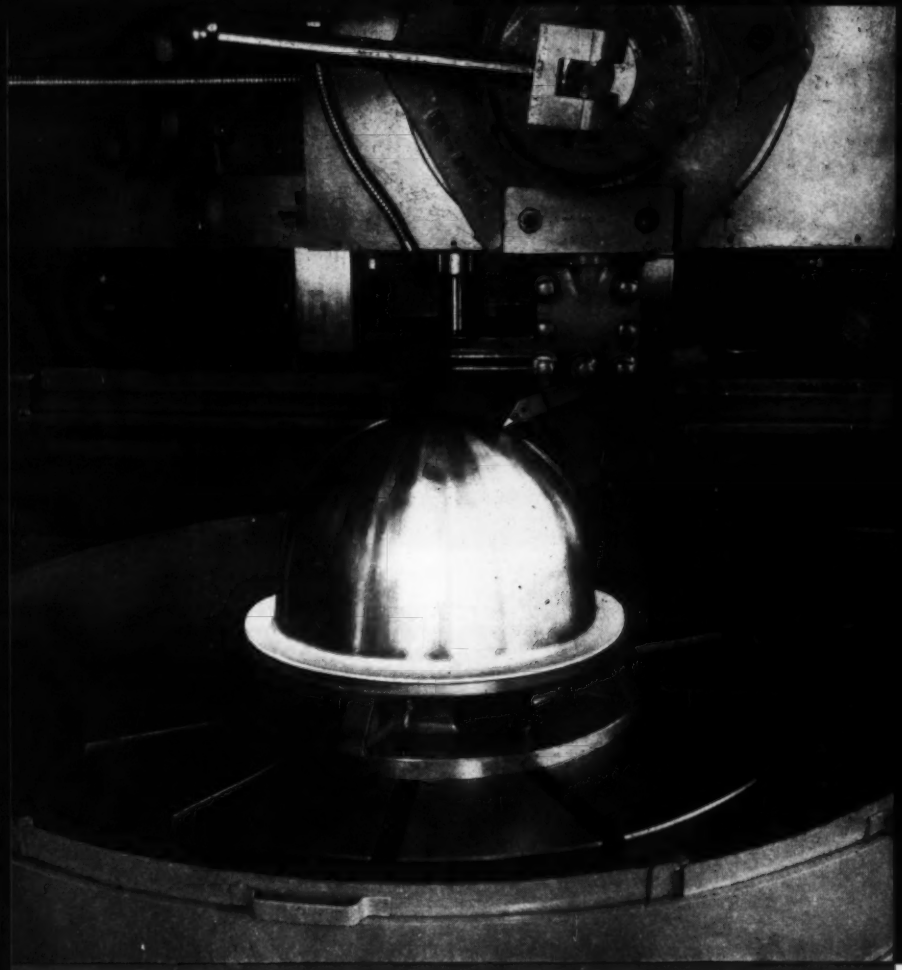
This shocking lack of confidence hurts deep down. On advice of counsel, we are referring the case to A. V. Scherer, chairman, publicity committee, American Welding Society. And as for doubting Donald, we hope he sits on a welding spark when April arrives: April, wreathed in electrodes, rods, and fluxes as well as flowers.

An Egyptian Kind

Gracie Fields told us who grew the biggest aspidistra in the world, but who, pray tell, built the biggest pyramid in the world?

Shrdlu

(Metalworking Outlook—Page 51)



XLO

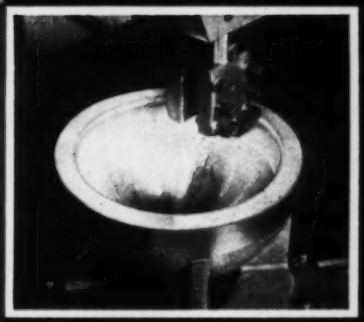
EX-CELL-O FOR PRECISION

LEFT: Single tracer-controlled tool contours aluminum forging to .080" wall thickness holding .001" tolerance inside and outside.

ABOVE: Compact Vertical Contouring Machine handles medium or large workpieces. Slim cabinet at right side holds electronic tracer controls.

Critical Contour Tolerances?

HOLDS WITHIN .001" OF TRUE CONTOUR—INSIDE AND OUT



Close-up shows Style 416 contouring the inside surface. Workpiece is held in a vacuum fixture mounted on the machine table.

58-7

Contouring within .001" of true contour—inside and out—*without waste* requires the kind of precision built into an Ex-Cell-O Style 416 Vertical Contouring Machine.

The aluminum forging illustrated was first contoured on its periphery with a single electronic-tracer-controlled tool, then precision-finished inside to .080" wall thickness.

Designed for contouring hemispherical or irregularly-shaped surfaces, Ex-Cell-O Style 416 Machines also face, bore, turn, groove and chamfer with automatic cycling between loading and unloading.

Call your local Ex-Cell-O Representative, or write directly to Ex-Cell-O for information on other Precision Vertical Boring Machines.

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DETROIT 32, MICHIGAN
Machinery Division

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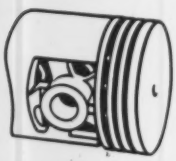

Every time you reorder the centertype wheel shown above, which grinds this automobile piston, that CINCINNATI (PD) wheel will act and grind exactly like the original . . . saving you time and money, and maintaining your production.

This is true of *any* CINCINNATI (PD) WHEEL you specify: centertype, centerless, internal, surface, toolroom, and snagging wheels.

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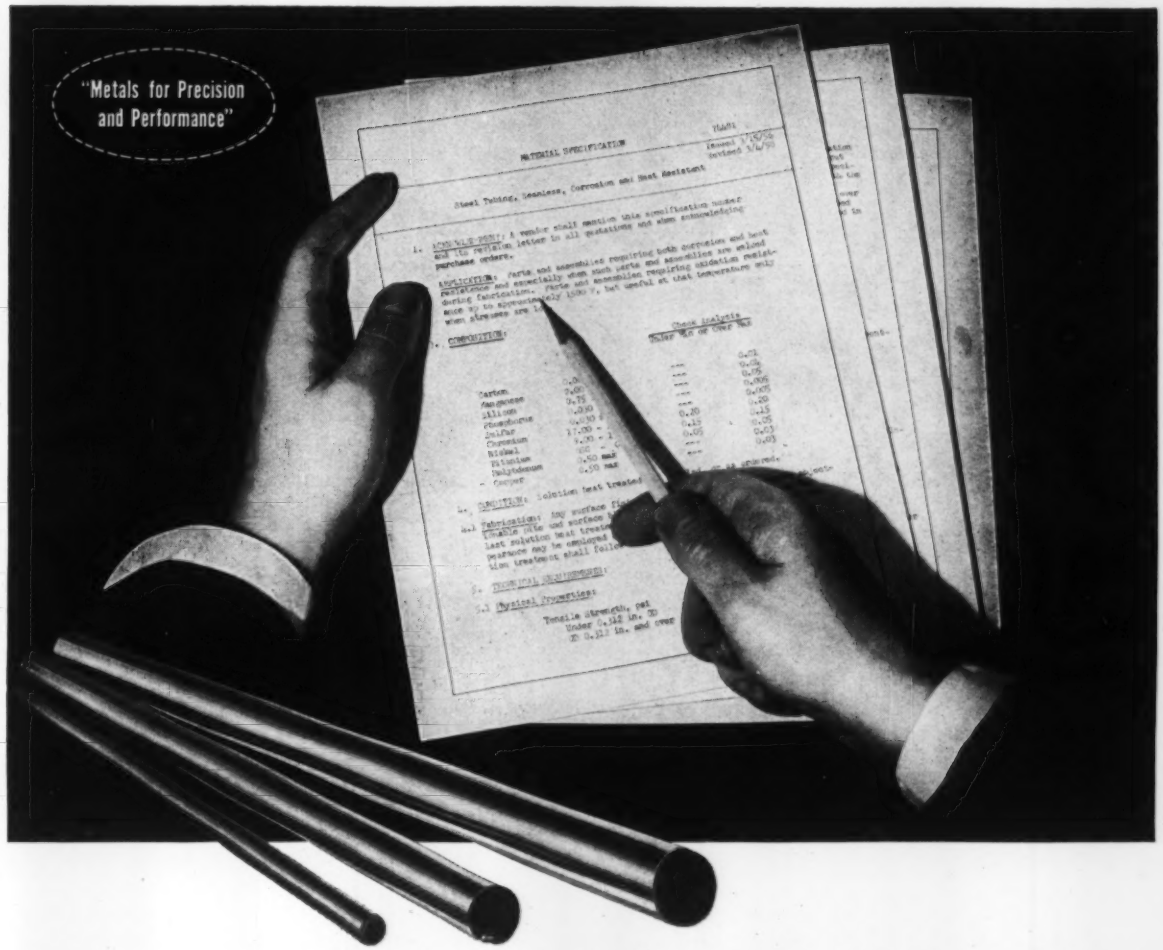

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GLASS-TO-METAL SEALING ALLOYS	Low expansion alloys for glass sealing applications	
CLAD METALS & COMPOSITE WIRES	Base metals & precious metals in various combinations	
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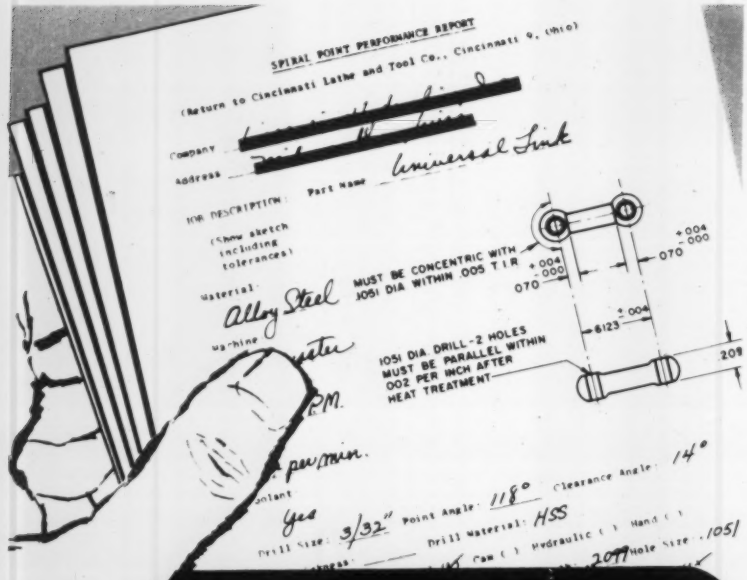

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PROFIT PICTURE

after another

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LETTERS TO THE EDITORS

Plaudits from India

I have just received your Jan. 5 magazine. This issue deserves a word of appreciation from every reader. It contains interesting, instructive, and useful information and data. The 1959 "Forum on Technical Progress" is rich with experience. "Facts and Figures of the Metalworking Industry" is full of interesting information though relating to your country only. "Changing Role of Metalworking Managers" is highly instructive.

I congratulate you on this excellent production, and I congratulate ourselves on receiving it.

V. S. Kudva

Technical Director
Canara Workshops Ltd.
Mangalore, India

Stop Wage-Price Spiral!

Congratulations on your excellent editorial, "Dear Mr. McDonald: Why a Steel Strike?" (Feb. 23, p. 43).

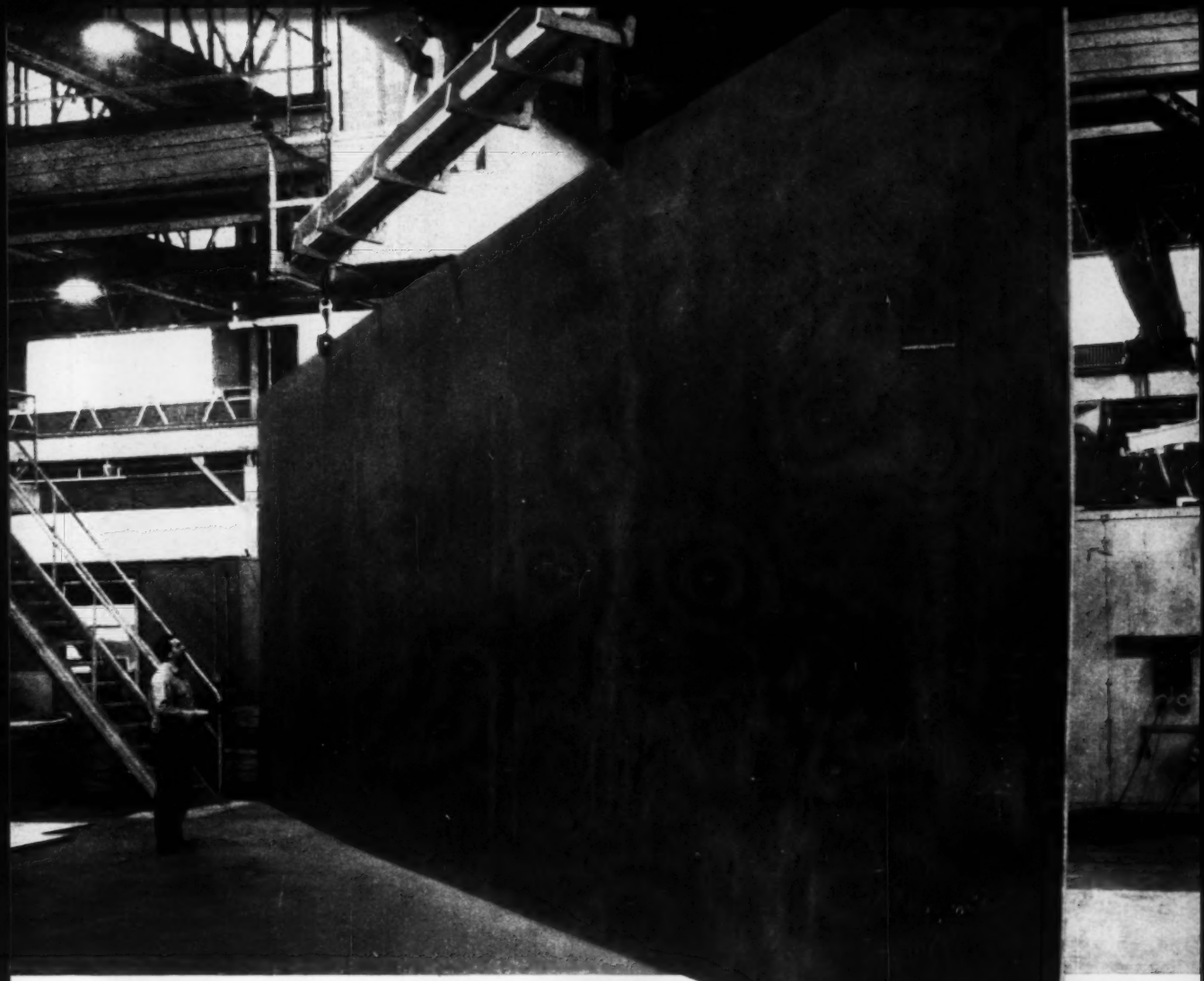
This type of editorializing must have broad circulation in publications outside the steel industry if it is to have the proper effect. May I suggest that reprints of this editorial be supplied by STEEL to various weekly and daily newspapers and to other magazines throughout the country.

Also, I believe it might be advisable for you to comment on how much of the savings from increased productivity should be passed on to labor. Actually, the productivity increases are made possible by the investment of large sums of money in superior, more expensive machinery rather than improvement in the efficiency of the individual's work habits. Perhaps, some people might feel it logical that these savings be passed along in the form of dividends since it was capital and management that made them possible.

In any case, it is my sincere hope that the basic steel producers will realize their great obligations to stop the inflationary wage-price spiral.

While labor has a profound obligation to hold down its demands, it seems a growing number of businessmen feel that the steel industry itself has a great obligation to conduct itself in a statesmanlike

(Please turn to Page 12)



sure it's big

. . . but not particularly big or unusual in Carlson's production of stainless steel plate

IT was normal, but not easy, for Carlson specialists to handle this big plate. Type 304-L stainless, it measured 7/16" x 131 1/2" x 452 9/16" and weighed an impressive 7923 pounds. And when this big one landed at the customer's receiving dock it was *exactly* what he wanted . . . *right* by chemical composition, *right* by physical standards, *right* to specification and *right* to size.

Whatever you need in stainless steel—big plates, small rings, formed or cut-to-shape items—will be produced accurately and on time. Stainless steel is our *only* business, and we know it. That is why you can depend on Carlson to give you *what you want when you want it!* Your inquiry is invited.

G.O.CARLSON *Inc.*

Stainless Steels Exclusively

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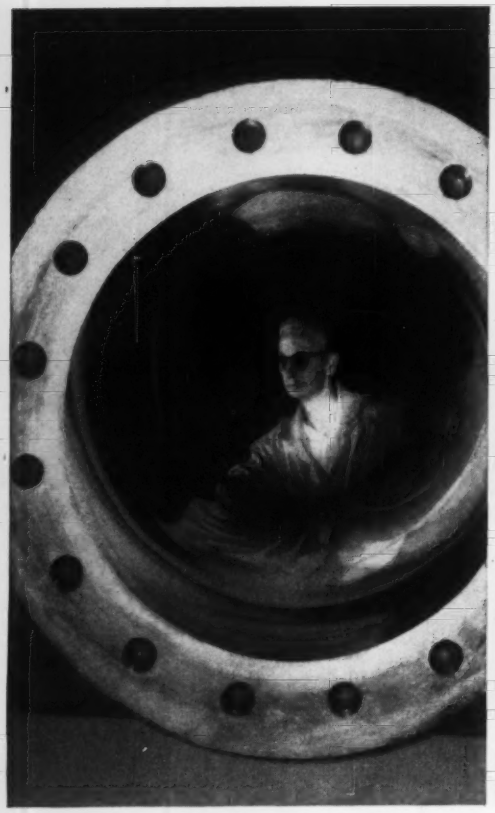

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Though built to stand the most rugged service, each Shenango casting is precisely-dimensioned to your exacting requirements. Whether you need rolls, bearings, bushings, mandrels, sleeves, liners, or any other essentially symmetrical part . . . *specify Shenango* for greater strength, greater wear-resistance, greater lasting power and greater savings, year after year.

Informative bulletins are yours for the asking. Write to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

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MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

LETTERS

(Concluded from Page 10)

manner and call a genuine halt to built-in inflation such as the last three year contract with the steelworkers provided. Let us hope there are a sufficient number of men in the industry who will stay by their guns regardless of the pressure used.

Incidentally, you may be interested to know that the total exports of American manufactured leaf springs in 1958 fell approximately 50 per cent below the 1957 exports. The reason for this sharp drop was primarily the fact that the wage-price spiral of inflation has priced American springs out of many world markets.

G. W. Hill

President
Service Spring Co.
Indianapolis

Praises Salary Series

Will you send me copies of the three articles on techniques for setting salaries of metalworking managers (Jan. 19, p. 42; Jan. 26, p. 52; Feb. 2, p. 60)? Congratulations on a fine series!

C. L. Sherran

Director
Public & Personnel Relations
Pfaudler Co. Div.
Pfaudler Permutit Inc.
Rochester, N. Y.

. . .

This series was both interesting and informative.

D. J. Thornton

Chief Industrial Engineer
Solar Aircraft Co.
San Diego, Calif.

Valuable in Marketing Work

Will you please send a copy of the 1959 edition of "Facts & Figures of the Metalworking Industry" (Jan. 5, opposite p. 138)? We have found this to be extremely valuable in our marketing work in the past and look forward to receiving the most recent edition.

Harold P. Smith

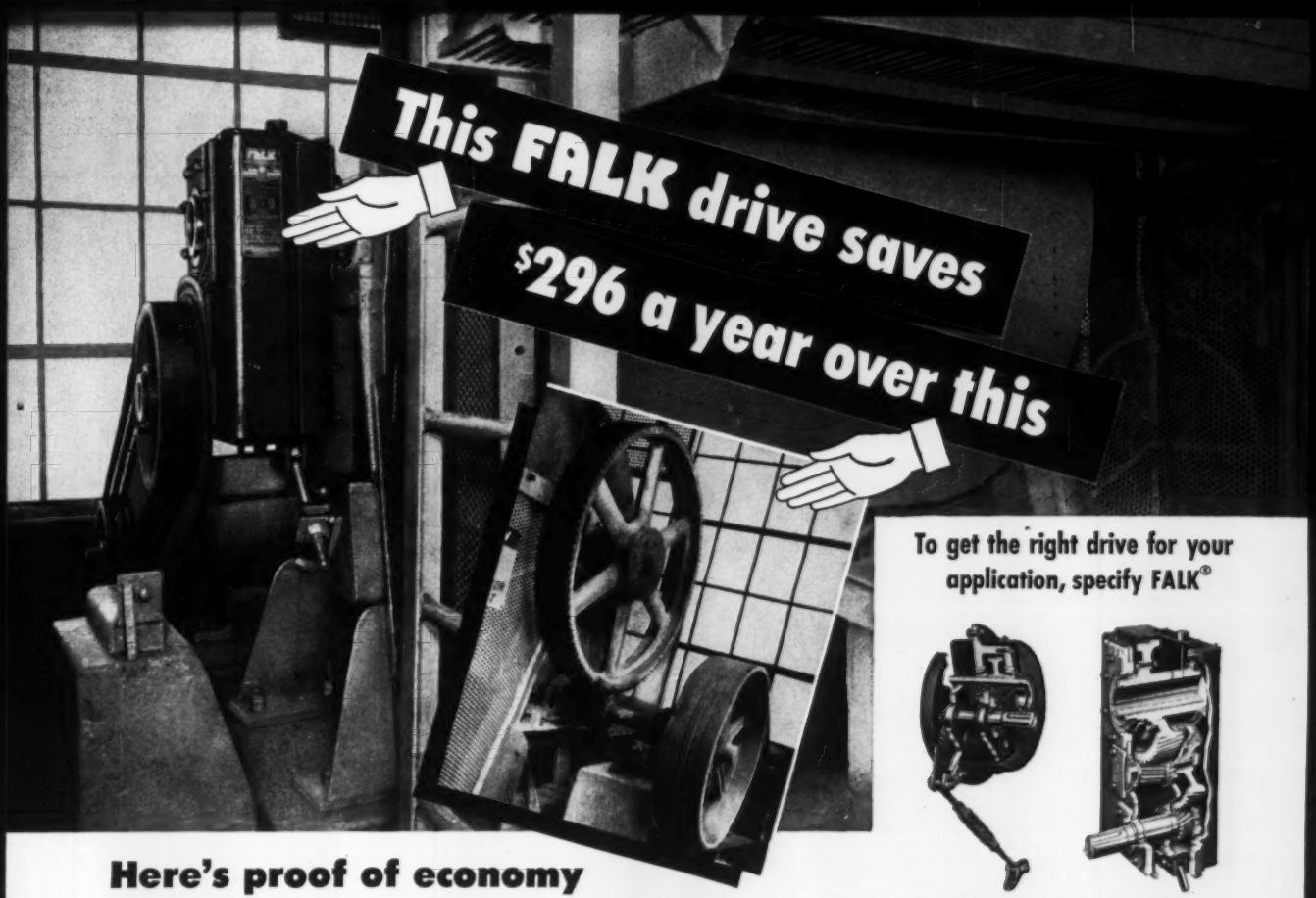
Commercial Development Dept.
Naugatuck Chemical Div.
U. S. Rubber Co.
Naugatuck, Conn.

Metal Selector Saves Hours

With deep gratitude, I acknowledge receiving a copy of the "Metal Selector, 1958 Edition" (Oct. 20, 1958, opposite p. 156). In the work I do, it is necessary to get an up-to-date picture of the actual status of things. Your selectors have saved me many hours.

Dimitri Vvedensky

Consulting Engineer
Battelle Memorial Institute
Columbus, Ohio



Here's proof of economy with FALK Shaft Mounted Drives

PROBLEM—For many years, a prominent Eastern abrasives manufacturer* experienced high maintenance and down-time costs, as well as excessive noise and vibration, in the operation of 19 pebble mills driven by open spur gears. Drive gears and jack shaft pillow blocks required frequent repairs or replacement, and trunnion shafts often failed, due to radial overloading of the bull gear when broken pinion teeth bottomed between gear teeth.

SOLUTION—After numerous unsuccessful approaches to these problems, the solution was found by mounting a Size 315J FALK Shaft Mounted Drive directly on the mill drive trunnion. This eliminated objectionable gear noise and vibration...greatly reduced costly down-time and loss of production...and cut annual maintenance and replacement expenses as indicated by the following figures taken from the customer's records:

Spur Gear-and-Pinion Drive		FALK Shaft Mounted Drive	
Bull Gears	$ 56	VEE Belts	$ 30
Pinions	120	FALK Shaft Mounted Drive (based on 10-year life)	70
Pillow Blocks	90		
VEE Belts	30		
Trunnion (5-year life)	100		
Annual cost	$396	Annual cost	$100
		ANNUAL SAVINGS	$296

IF OBSOLETE DRIVES ARE COSTING YOU MONEY, a change to Falk All-Steel Shaft Mounted Drives can effect important savings in money and production. Used on almost any type of machine, these compact, rugged units are establishing new standards of economy and efficiency in many industries. Specify FALK Drives on your purchased equipment...For full details, **write for Bulletin 7100.** *Name on request

THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS

Representatives and Distributors in Most Principal Cities

To get the right drive for your application, specify FALK®

SHAFT MOUNTED DRIVES

Horizontal or vertical units—½ to 50 hp—420 to 5 rpm—single and two double reduction ratios—output torque ratings up to 41,000 lb-in (consult factory for higher torque capacity).

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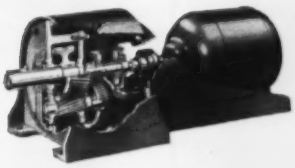

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Sizes up to 75 hp—furnished with or without standard foot-mounted motor—standard output speeds 1.2 to 520 rpm (with 1750 rpm motors) —ratios as high as 54,000:1 in semi-standard designs. Integral units (gearmotor type) also available. Ask for **Bulletin 3100.**

• • •

FALK Drives are available from factory and distributor stocks from coast to coast. Consult your Falk Representative or Distributor.

FALK

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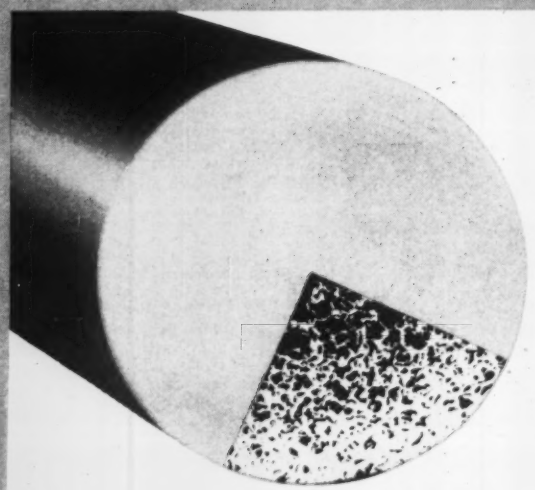
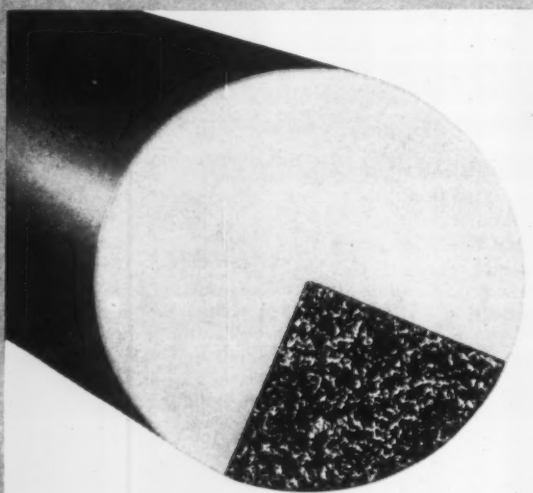
Republic Cold Drawn Carbon Corrected Bars

REDUCE YOUR COSTS 3 WAYS!



Photomicrograph showing decarb to a depth of .020″ in the surface of hot rolled bar of C-1050 steel—magnified 100 times.



Here is the same bar after carbon correction annealing. Note the restoration of carbon on the outer surface, also the refinement of grain structure.

1. You save both metal and money by eliminating waste. Republic Carbon Corrected Bars eliminate the extra preparation of machining or grinding away the surface of the bars to remove decarb.

2. You eliminate the need for buying bars oversize to allow for decarb removal to depths of 20 thousandths of an inch or more.

3. You get better MACHINABILITY.

Carbon correction is the restoration of all the carbon lost from the bar surface through decarburization during hot rolling. The lost carbon is restored right out to the surface of the bar by annealing in a controlled carbon-rich atmosphere prior to cold drawing.

Another advantage of this process is the resulting refinement of grain structure as indicated in the photomicrographs.

Carbon Corrected Bars are ideally suited for your steel parts calling for high surface hardness—particularly those produced by high frequency induction heating.

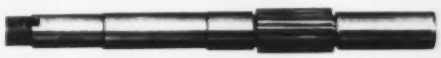
To the advantages of carbon correction add the improved machinability produced by the cold drawing process. You can eliminate finishing operations by taking advantage of the full diameter of Republic Cold Finished Steel Bars. You can boost feeds and speeds with no sacrifice of tool life or finished surface quality. You can secure better product performance through the higher ultimate strength, yield point, and hardness of cold drawn steel.

Republic metallurgists and machining specialists are available to help you use Republic Cold Drawn Carbon Corrected Bars to best advantage. They are ready to help you raise production efficiency, lower unit cost, obtain better machinability. No obligation. Just mail the coupon.

REASONABLE COST, GREAT STRENGTH, AND PRECISE TOLERANCE are requirements met by Republic Cold Finished Alloy Steel Bars in the production of sucker rod couplings. The parts must also withstand enormous static and dynamic loads, to more than 40,000 psi. Alloy steels provide an outstanding co nbination of qualities essential to designing smaller sections to carry heavier loads safely. By adding the advantages of the cold finishing process, you have a material that offers strength, hardness, machinability, size, and cross-sectional accuracy, smooth bright surface, and close tolerance straightness. Send coupon for more information.

REDUCE COSTS, IMPROVE QUALITY, INCREASE PRODUCTION with Republic Cold Drawn Special Sections. Formed to the predominating cross-section of the part to be produced, special sections eliminate or greatly reduce required machining. Results are faster output and lower cost. Also, since cold drawing improves the physical properties of any given analysis, completed parts are stronger and longer wearing. Other advantages may include improved performance and simplified design. Send coupon for full facts.

MACHINABILITY, SUPERIOR STRENGTH, AND CORROSION-RESISTANCE are reasons for the use of Republic Cold Finished Stainless Steel Bars in parts such as outboard motor drive and propeller shafts. Republic's cold finished, free-machining stainless steel bars offer close tolerance, accuracy of section, uniform soundness, and fine surface finish. Two grades, A.I.S.I. Types 416 and 430-F are fully 90% as machinable as Bessemer screw stock. Republic also supplies ENDURO® Stainless Steel in hot rolled bars, special sections, and wire. For more facts, mail the coupon.



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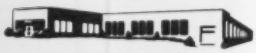

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How GENERAL STEEL CASTINGS can improve product design and performance

The demands of progress in today's industrial economy impose exacting new operating and service standards upon "capital goods" machinery and equipment. To build into their products the stamina necessary to meet these requirements, more and more manufacturers are taking advantage of the superior properties inherent in steel castings.

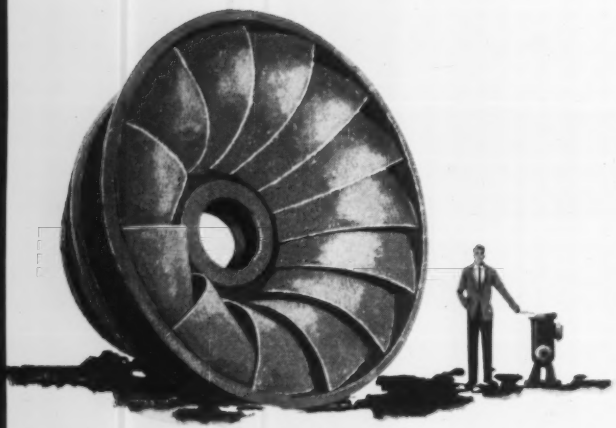
The great freedom of metal distribution possible in steel castings results in a maximum strength-to-weight ratio, compactness, flexibility of design details, high shock resistance, and long service life. The full advantages steel castings have to offer in your product, however, can be gained only through the experienced application of a wide range of services.

General Steel has pioneered for more than 50 years in providing to industry a complete service, ranging from design through production, for cast steel structures and steel castings used in cast-weld and composite structures. Today the company serves a wide variety of industries in the United States and many foreign countries. Now, with a continuing expansion program, General Steel offers this complete service to additional manufacturers who seek to keep pace with industrial progress by increasing the value, performance, and engineering economies in their products.

this is General Steel.....

where industrial progress is cast in steel....

NOW...take advantage of this complete service to meet your specialized requirements



From concept to casting, General Steel offers a complete service . . . a unique blending of research and development, creative design, quality production, and follow-through in the field.

In two strategically located plants General Steel has the space, facilities and staffs to plan, develop and engineer structures to meet your specialized requirements. We are equipped to work from your specifications . . . or simply with "raw ideas". We prefer to work with you from the start, for it is in this kind of teamwork that our skills most successfully complement your own.

General Steel's Granite City Plant in the St. Louis Industrial Area includes 127 acres, 37 of which are under roof, and has a capacity of about 4000 tons of finished castings monthly.

General Steel's Eddystone Plant in the Philadelphia Industrial Area includes 112 acres with 20 under roof, and has a monthly capacity of approximately 3000 tons of finished industrial castings.

Application Analysis.....

Sales, Engineering, and Manufacturing personnel evaluate your products' structural requirements and work with you to determine the most advantageous applications of steel castings.

Design Engineering.....

Creative teamwork between your staff and our engineers brings many specialized talents together to develop optimum structural design.

Metallurgical Service.....

Experienced staffs and fully equipped laboratories provide up-to-date metallurgical counsel in addition to close manufacturing control of materials.

Production Facilities.....

Two plant areas, exclusive of our National Roll and Foundry Division, have experienced personnel and complete facilities for producing machined castings ranging in size from 100 pounds to 100 tons.

Non-destructive Testing.

Radiographic, magnetic particle and ultrasonic inspection equipment together with specialized personnel assure compliance with the most exacting quality standards.

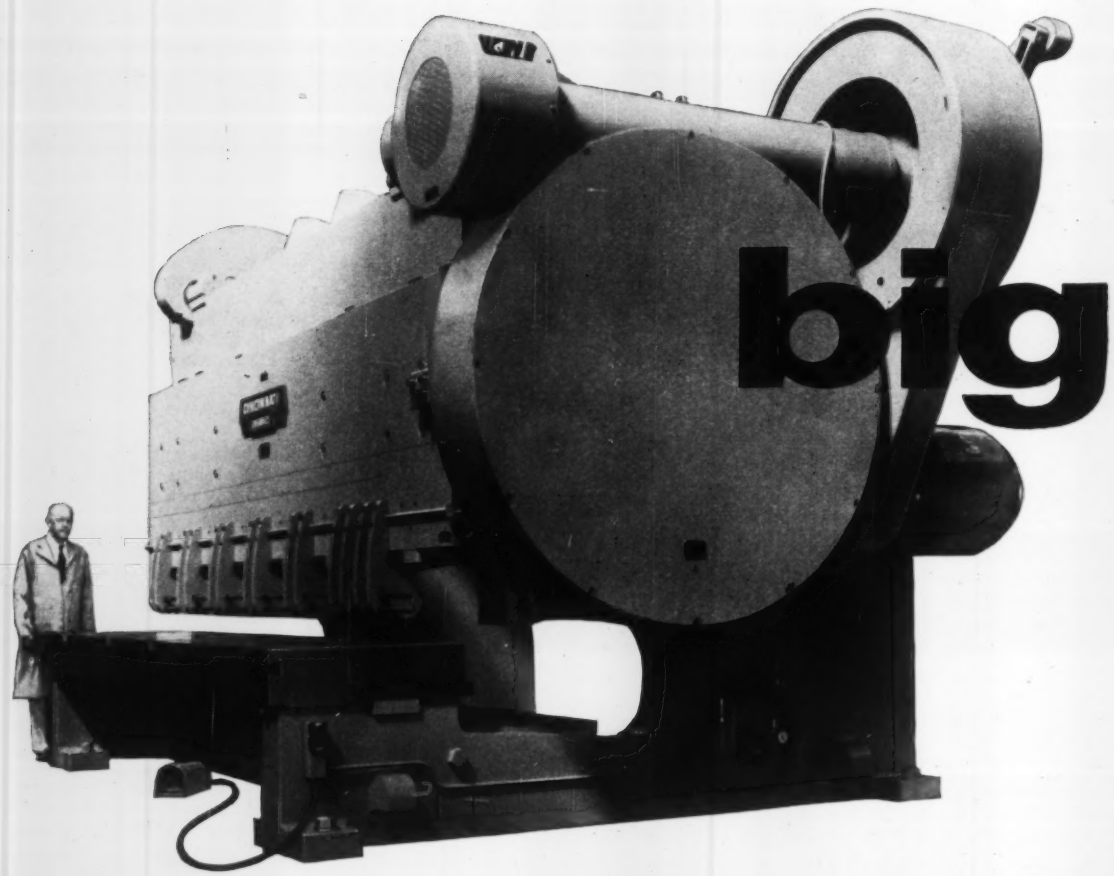
Field Service.....

Follow-through in the field by specialized personnel from all departments of the company insures that all structural performance requirements are met.

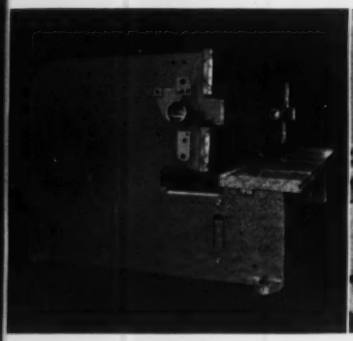
LET US CONSULT WITH YOU ON YOUR PRESENT PRODUCTS ...AND FUTURE PROJECTS. CALL US IN NOW.

GENERAL STEEL CASTINGS

GRANITE CITY, ILL. • EDDYSTONE, PA. • AVONMORE, PA.

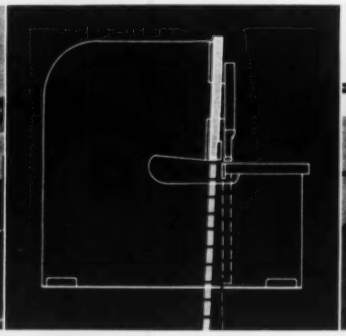


Typical Cincinnati® Shears: **big** series 15012, capacity 1½", 12'; **small** series 1004, capacity 3/16", 4'; **in between** series 1810, capacity ¼", 10'.



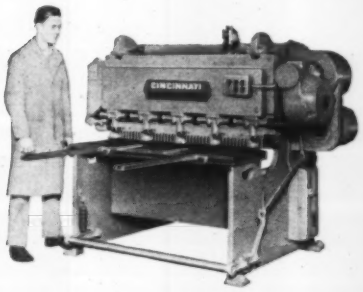
All steel, interlocked construction—no welds used as load supports

Hydraulic holddowns exert tons of pressure, insure accuracy

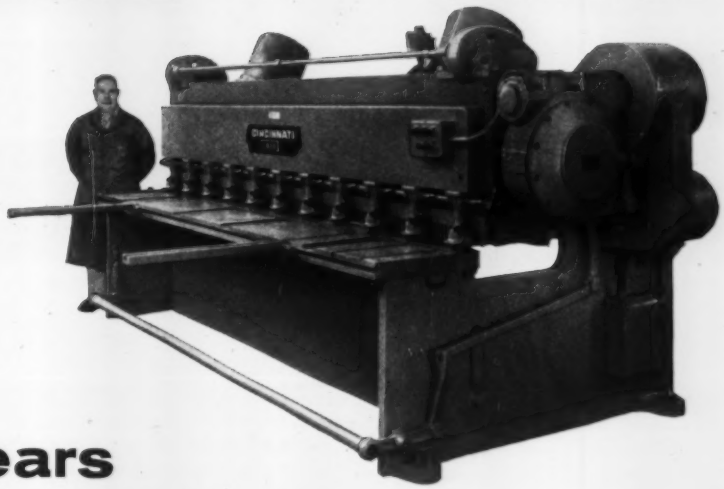


Non-float inclined ram maintains extremely accurate knife clearance

Front controlled power back gage is standard, accurate



small or in between



Cincinnati® Shears give you every advantage

Simple operation, micrometer accuracy, cost-cutting speed, all-steel construction, and versatility—these are the advantages which make Cincinnati Shears earn their way in your plant.

And, whether you're shearing steel or plastics, nonferrous metals or asbestos, wire mesh, clad metals, or even radioactive material, the Cincinnati Shear line gives you a range of choices to fit your own requirements. Cincinnati Shears are in service cutting all of these materials.

Cincinnati ruggedness enables you to use one knife clearance for all thicknesses up to machine capacity.

Power operated back gages which are standard equipment, reduce non-productive time. Hydraulic holddowns provide tons of pressure, insure accuracy. The inclined ram permits the economy of four-edged knives, keeps work from binding between back gage and lower knife.

Since gap frames are standard, you can do notching, slitting or shearing work longer than the machine on any Cincinnati® Shear to the limit of its gap.

Be sure to get the full Cincinnati story before you buy your next shear. Write Dept. C for Catalog S-7R.

Shapers / Shears / Press Brakes

THE CINCINNATI SHAPER CO.

Cincinnati 11, Ohio, U.S.A.

New Star Performer In The Sandvik Line

SANDVIK

Presents A SUPER SPRING STEEL

Hardened & Tempered Spring Steel

Annealed Spring Steel

Band Saw Steels

Flapper Valve Steel

Piston Ring Steels

Razor Blade Steel

Shock Absorber Steel

Sandvik's new 2R25 is a superior grade of stainless spring steel which goes far beyond the capabilities of ordinary spring steels. It was developed for applications where performance outranks cost.

This new steel is a prime example of Sandvik's ability to combine several advantageous properties in one metal.

Sandvik 2R25 is exceptionally tough and resilient, much more formable than hardened and tempered steel, has up to 10 times the fatigue life of ordinary carbon spring steel and has excellent corrosion resistance under varying atmospheric conditions.

Mechanical Data on 2R25 —

TENSILE STRENGTH RANGE — Hard Rolled 242,000 • 270,000 or 299,000 PSI Heat Treated 270,000 • 299,000 or 327,000 PSI

ELASTIC LIMIT (.01% Proof Stress) — From 156,000 to 192,000 PSI according to size and finish

MODULUS OF ELASTICITY — 27.7 to 35.6 x 10^6 PSI according to size and finish

SIZES (with extremely close tolerances)
Thickness — .0016" to .035"
Width — .039" to 3.94"

For further information on Sandvik 2R25, contact your nearest Sandvik office

Sandvik stocks a wide variety of qualities and sizes of cold rolled specialty strip steels. In addition Sandvik has rolling, slitting, edge-filing and hardening and tempering facilities. *Send for your copy of this free brochure* which gives specific data on the leading types of Sandvik steels.

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SS-178

CALENDAR
OF MEETINGS

Mar. 16-18, Society of Automotive Engineers: National passenger car, body, and materials meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 16-20, American Institute of Chemical Engineers: Winter meeting, Chalfonte-Haddon Hall, Atlantic City, N. J. Institute's address: 25 W. 45th St., New York 36, N. Y. Secretary: F. J. Van Antwerpen.

Mar. 16-20, National Association of Corrosion Engineers: Annual conference and exhibit, Sherman Hotel, Chicago. Association's address: 1601 M & M Bldg., Houston 2, Tex. Secretary: T. J. Hull.

Mar. 16-20, Western Metal Exposition & Congress: Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles. Sponsor: American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio. Assistant secretary: Ray T. Bayless.

Mar. 17-19, American Machine Tool Distributors Association: Spring meeting, Sheraton Park Hotel, Washington. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Mar. 17-19, Investment Casting Institute: Annual meeting, Surf Rider Hotel, Santa Monica, Calif. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

Mar. 18-20, Electronic Industries Association: Spring meeting, Statler-Hilton Hotel, Washington. Association's address: 1721 DeSales St. N.W., Washington 6, D. C. Secretary: James D. Secrest.

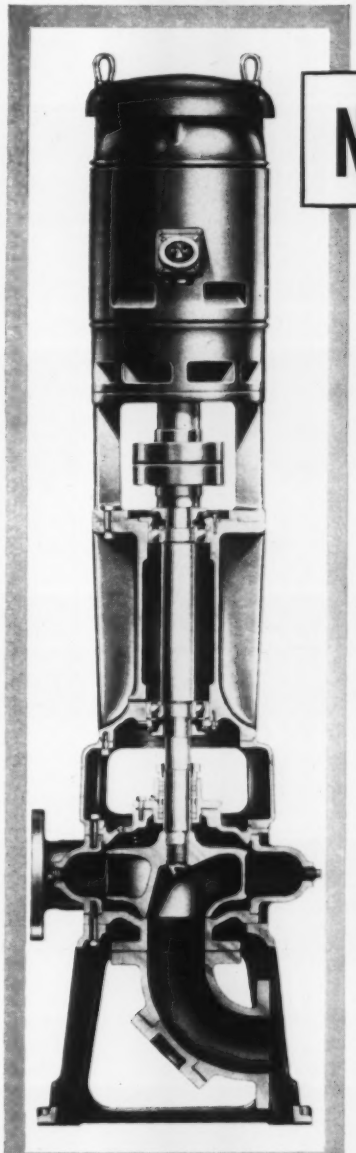
Mar. 19-20, Society of Automotive Engineers: National production meeting, Sheraton-Cadillac Hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Mar. 23-24, American Management Association: Special manufacturing conference on integrated materials management, Roosevelt Hotel, New York. Association's address: 1515 Broadway, New York 36, N. Y. Manufacturing division's manager: Clifford J. Craft.

Mar. 24-25, Institute of Printed Circuits: Annual meeting, St. Moritz Hotel, New York. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: H. P. Dolan.

Mar. 31-Apr. 3, Society of Automotive Engineers: National aeronautic meeting and production forum, and aircraft engineering display, Hotel Commodore, New York. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

For higher pumping efficiency
of solids in suspension!



NEW

Fairbanks-Morse
5440A Non-Clog Pumps

Ideal for pumping unscreened liquids with large solids in suspension

- **industrial wastes**
- **sanitary sewage disposal**
- **industrial processes**

Here is your answer to higher efficiencies wherever you are pumping solids in suspension!

All-new Fairbanks-Morse 5440A Non-Clog Pumps feature quick, easy convertibility between any of the many vertical and horizontal types. Power requirements of the pump are always perfectly matched to the electrical and mechanical components. Precision-machined centering fits assure accurate alignment. Exclusive F-M bladeless impeller design minimizes maintenance by preventing clogging from solids and stringy material. The 5440A is only one of many F-M solids-handling pumps designed to meet a broad range of requirements. For information, write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

Ask for new 5440A BULLETIN!

FAIRBANKS-MORSE
a name worth remembering when you want the BEST

ELECTRIC MOTORS · DIESEL, DUAL FUEL AND GAS ENGINES · PUMPS
COMPRESSORS · GENERATORS · MAGNETOS · HOME WATER SYSTEMS

THREAD ROLLING

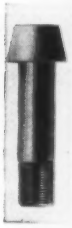
Field installations of the new LANHYROL Thread Rolling Machine are producing outstanding results. Production data from representative jobs, as shown, indicate the unequalled output, flexibility, and range coverage of this revolutionary new machine, not available anywhere else in the Western Hemisphere.

The LANHYROL Thread Rolling Machine produces strong, accurate threads of excellent finish by the chipless, cold-forming process using four different Rolling Methods—Thrufeed, Infeed, Continuous, and Reciprocal. It will thread all diameters from 3/16″ to 3″, producing left- and right-hand threads of all types (except square), including UNC, UNF, Acme, worm, and many special forms.

Additional information on request—please send specifications and ask for Bulletin E-60.

WORKPIECE: Jack Screw
MATERIAL: C1018 Steel
THREAD SPECIFICATIONS:
1″-5 pitch 29° Acme
TOLERANCE: Class 4C
METHOD: Thrufeed Rolling
PRODUCTION: 30″ per minute (rolled in 36″ lengths—can be rolled in 12′ lengths)

WORKPIECE: Transfer Drive Worm
MATERIAL: Stainless Steel
THREAD SPECIFICATIONS: 1/4″-26 diametral pitch, left-hand, single—3/4″ thread length
TOLERANCE: .1825—.1805 P.D.
METHOD: Infeed Rolling (manual loading)
PRODUCTION: 20 pieces per minute



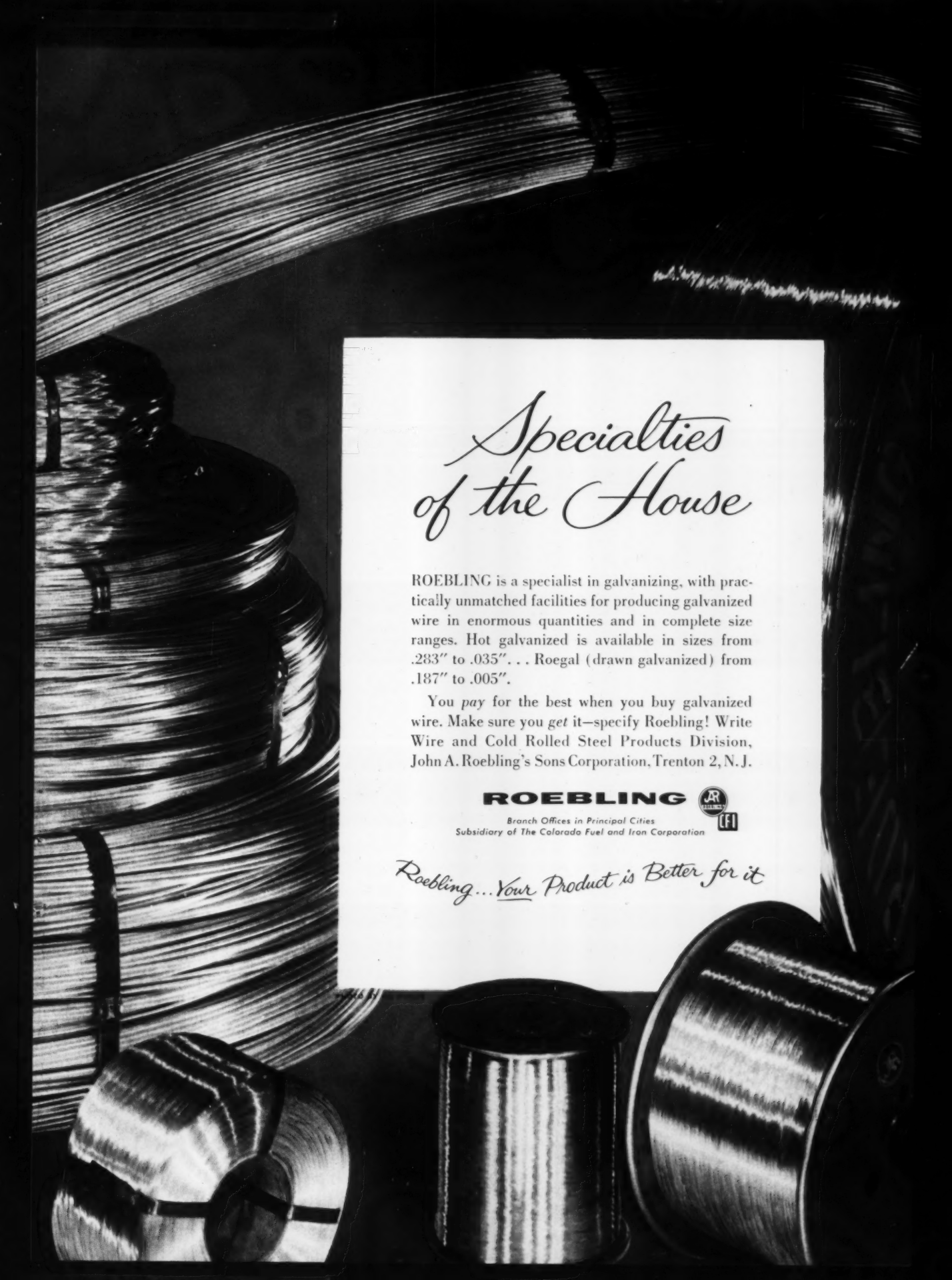
WORKPIECE: Aircraft Bolt
MATERIAL: 4340 Steel of 36-40 Rockwell C
THREAD SPECIFICATIONS: 1″-14 pitch NF—1-5/16″ thread length
TOLERANCE: Class 3A (Military Spec. MIL-B-7838-A)
METHOD: Infeed Rolling (manual loading)
PRODUCTION: 10 pieces per minute

WORKPIECE: Barrel—MG Gun Perforator
MATERIAL: .60 Carb. Silicon Tool Stl.
THREAD SPECIFICATIONS: 1-7/8″-6 pitch Stub Acme—1″ thread length
TOLERANCE: Class 3G
METHOD: Infeed Rolling (hand-operated workholding fixture)
PRODUCTION: 15 pieces per minute

468

LANDIS *Machine* COMPANY
WAYNESBORO • PENNSYLVANIA • U. S. A.

LANHYROL



Specialties of the House

ROEBLING is a specialist in galvanizing, with practically unmatched facilities for producing galvanized wire in enormous quantities and in complete size ranges. Hot galvanized is available in sizes from .283″ to .035″. . . Roegal (drawn galvanized) from .187″ to .005″.

You *pay* for the best when you buy galvanized wire. Make sure you *get* it—specify Roebling! Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING

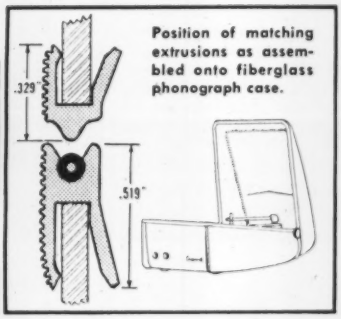
Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

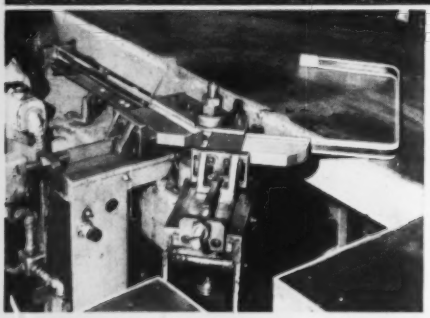
800 Bends An Hour

IN ANODIZED EXTRUSIONS ON PINES MODEL ¾ BENDING MACHINE

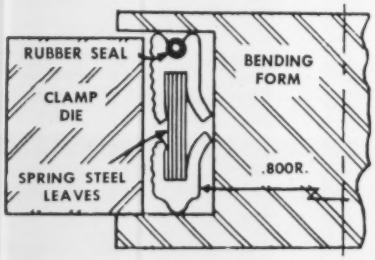
View of 12-year old Pines Model ¾ Bending Machine at Kinkead Industries Incorporated, Chicago, bending decorative aluminum extrusion closure strips.



Position of matching extrusions as assembled onto fiberglass phonograph case.



Close-up showing tooling employed in bending two matching extrusions simultaneously. Black strip separating two extrusions is spring-steel mandrel used to prevent collapse of open sections during bending.



Extrusions are positioned in tools as illustrated above. Die surfaces are nylon coated to prevent scratching the anodized finish. Rubber seal is installed in straight lengths before bending.

How Accurate Bending Simplifies Fitting of Scratch-Free, Matching Closures on Phonograph Cases

A unique tooling setup on a Pines Model ¾ Bending Machine enabled Kinkead Industries Incorporated, of Chicago, to fill an order for accurate 90° bends in matching aluminum extrusions. Bends are made simultaneously in a pair of extrusions at net production averages of 800 bends, or 100 pair of frames, per hour. Accurate forming simplifies corner fitting and assembly of the completed pieces used as closure strips on phonograph cases. As illustrated, the two extrusions are mounted on spring-steel strips which serve as an internal mandrel and prevent collapse of the sections in the bend area. Bending the two strips simultaneously assures perfect mating when assembled onto the fiberglass cases.

Ends Meet in Butt-Fit Without Trimming

Before bending, both of the extruded shapes are anodized to a beautiful, bright finish. Die surfaces are faced with nylon to protect the decorative finish and prevent marring during the bending operation. No lubrication is required. The uniform accuracy of the bending operation also eliminates any need for trimming the precut stock. The ends meet in a butt-fit. Kinkead's fine line of stainless steel and aluminum products, known as "Kintrim," is another example of the quality bending results that have long been achieved on Pines Benders. Look to Pines for the practical solution to *your* bending problems.

PINES ENGINEERING CO., INC.

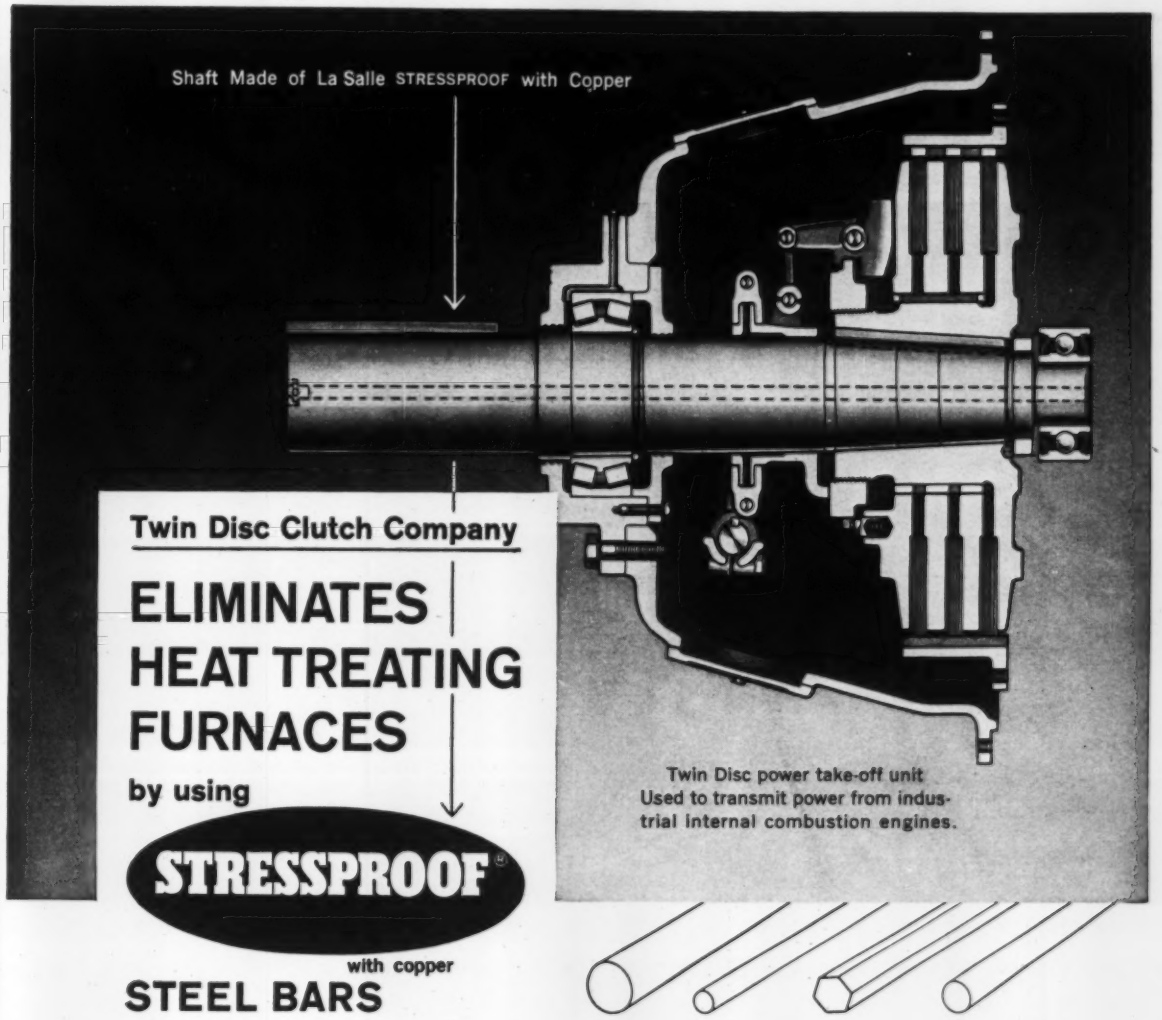
Specialists in Tube Fabricating Machinery

662 WALNUT • AURORA, ILLINOIS

WRITE FOR FREE CASE STUDIES

For case study reports on the cost-cutting advantages of cold forming the "Pines-Way," write for free copies of Pines News. For analysis on any job, ask a Pines representative to call.

PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY



Twin Disc power take-off unit
Used to transmit power from industrial internal combustion engines.

Twin Disc Clutch Company

ELIMINATES HEAT TREATING FURNACES

by using

STRESSPROOF®

with copper

STEEL BARS

In Racine, Wisconsin, Twin Disc Clutch Co. saved money on a plant addition by eliminating heat treating furnaces . . . and they continue to save on part costs by using a material which needs no heat treatment . . . STRESSPROOF.

On the strength of over 15 years' experience with STRESSPROOF, Twin Disc knew they could cut their costs by purchasing this material which has the necessary properties in the bar.

They produce about 150 different models of power take-off shafts . . . see cross-section drawing. These shafts must possess great toughness and have the strength to take heavy loads. They must resist wear at the journals. Because one end of each shaft must be machined to individual customer specifications, machinability is important. Warpage after machining cannot be tolerated.

STRESSPROOF with copper fills these requirements on all counts because it has these four qualities in the bar: (1) Strength without heat treating. (2) Machinability (copper further improves machinability). (3) Excellent resistance to wear. (4) Minimum warpage.

By using STRESSPROOF, Twin Disc eliminates the cost of heat treating, cleaning and straightening. Working conditions are better . . . the plant is cleaner and cooler, and floor space requirements are less. Time and money consuming production steps are eliminated.

Twin Disc gets better parts at lower cost, and perhaps you can profit by their experience. Unless you have investigated STRESSPROOF recently, you may be overlooking worthwhile savings, especially since copper has now been added to improve machinability.

Available from your Steel Service Center.

La Salle STEEL COMPANY
1414 150th Street, Hammond, Indiana

Please send literature describing La Salle STRESSPROOF with copper.

name_____

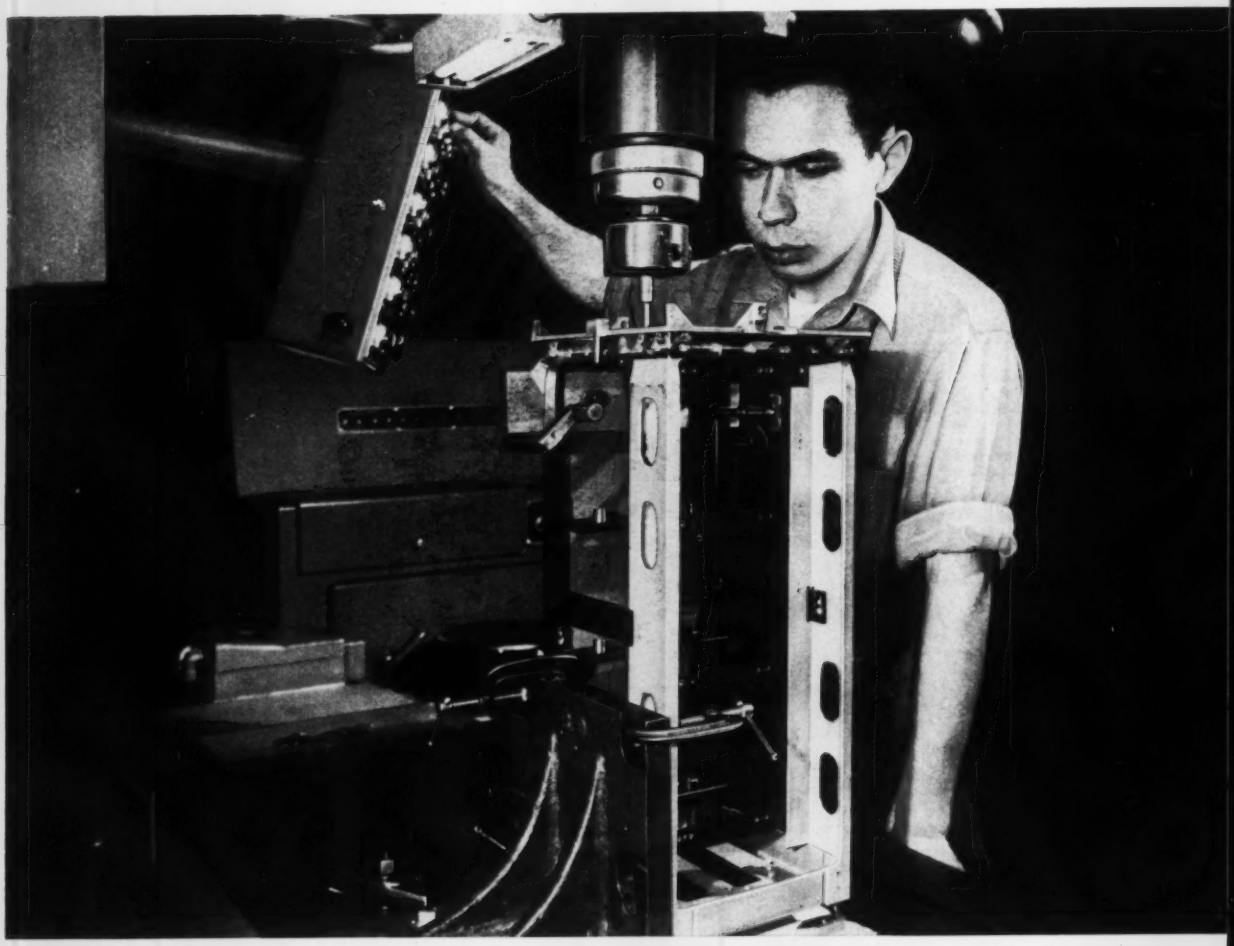
title_____

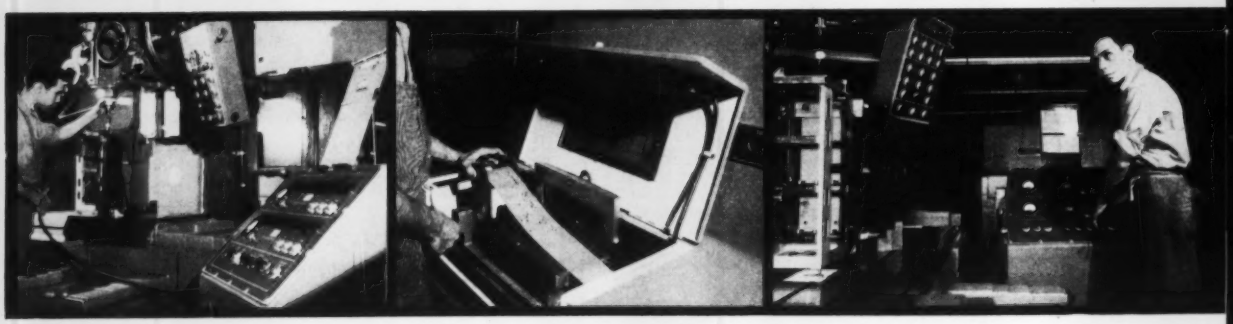
company_____

address_____

city_____ zone_____ state_____

ACCURACY





BETTER WORK IS DONE FASTER... because the work is positioned automatically, leaving the operator free to concentrate on the cutting action and the quality of his work.

HUMAN ERRORS ARE ELIMINATED... since all positioning data is fed into the machine by this easily prepared punched tape. There's no chance to mis-read or mis-set dials or verniers.

EASILY SET DIALS... are provided to permit fast, accurate manual positioning of the machine for simple workpieces and other similar jobs where use of the punched tape is not desired.

ASSURED...

...AND MACHINING TIME **CUT IN HALF** WITH PRATT & WHITNEY NUMERICAL CONTROL

A specialist in ultra-precision machining, the Liverpool Machine Tool Company Inc., of Brooklyn, N.Y., employs about 50 people and handles subcontract work for many nationally known manufacturers. All work must be held to extremely close tolerances. To give its customers "something better and faster," Liverpool purchased a Pratt & Whitney Jig Borer with Numerical Control a year ago, "... a huge investment for a plant of our size." The company now reports that most jobs on the P&W Numerically Controlled Jig Borer are done in *half the time* that would be required under manual operation. Production costs have dropped correspondingly, and lower rates for precision work have resulted in many new customers and much profitable new business.

The greatly increased machine utilization made possible by P&W Numerical Control assures that the machine is kept busy at all times; operation is so easy and economical that it can be used efficiently for a very wide range of jobs ... including much work previously handled on drill presses and many small parts once made largely by hand. Since increased business has meant more money for everyone, employees throughout the Liverpool plant are enthusiastic about Numerical Control.

In the past, small and medium sized plants have believed that Numerical Control was too expensive to permit investment. However, Liverpool's experience proves conclusively that no plant of *any* size can afford to overlook the business- and profit-building power of Numerical Control. It will pay *you* to find out the facts, so write today for Circular No. 609. Pratt & Whitney Company, Inc., 13 Charter Oak Blvd., West Hartford, Conn.

PRATT & WHITNEY

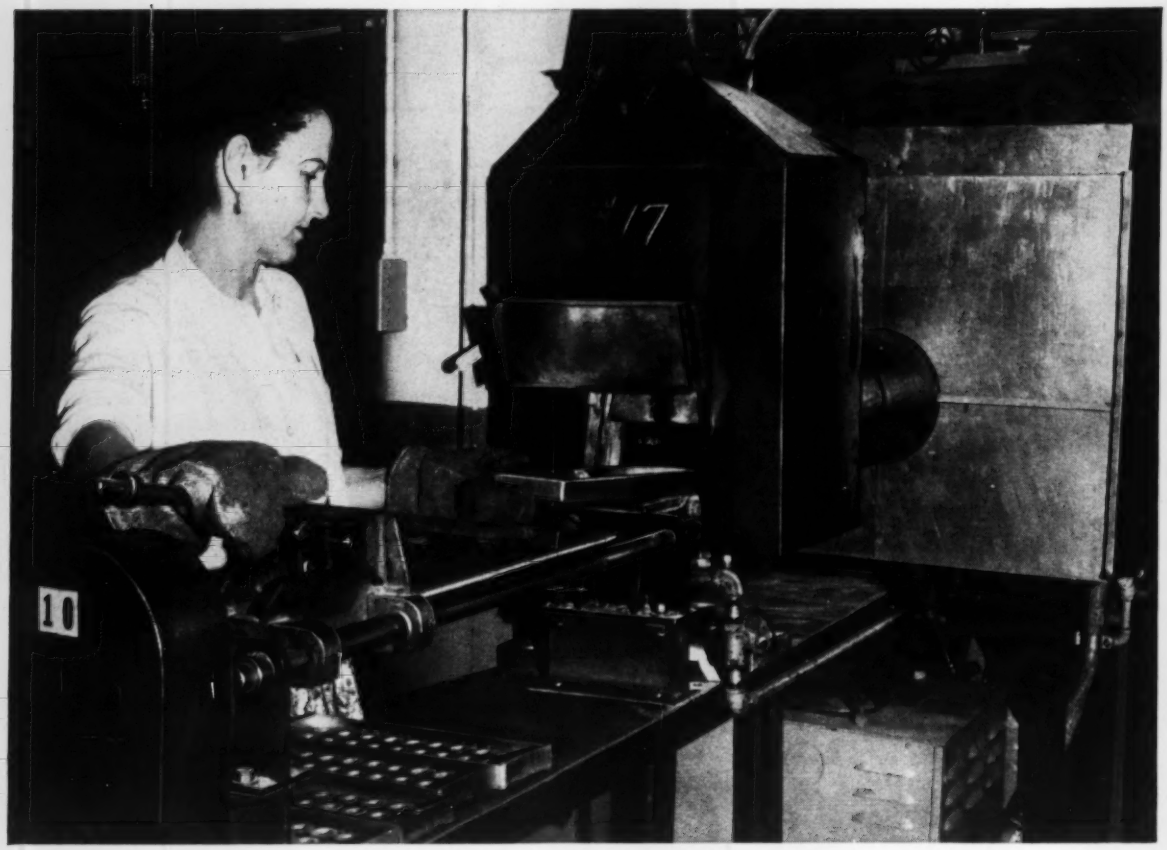
FIRST CHOICE FOR ACCURACY

MACHINE TOOLS • GAGES • CUTTING TOOLS

AUTOMATICALLY POSITIONING WORK ACCURATE TO .0001" ... the P&W Numerically Controlled Jig Borer combines toolroom precision with production-line speed, economy.

SETTINGS ACCURATE TO 5 SECONDS OF ARC ...are made automatically by the P&W Rotary Table with Numerical Control. Speeds work, eliminates human errors.

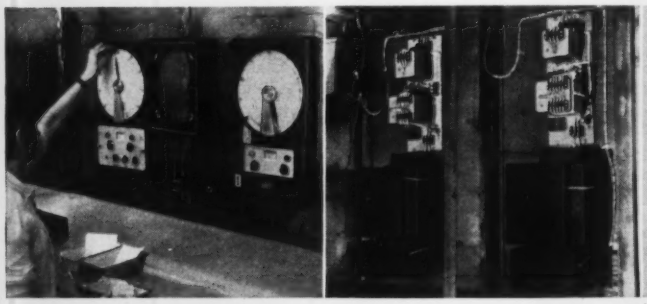
PROFILE MILLING ENTIRELY UNDER TAPE CONTROL... the numerically controlled P&W Numeric-Keller produces irregular shapes without the need for any template or model.



Fansteel Metallurgical Corp.: Operator loads sintering furnace with trays of FASTELL® heavy duty electrical contacts.

Critical sintering temperatures a problem?

Not at Fansteel Metallurgical Corp., where Speedomax® H is regulating moly heaters and simplifying control of critical sintering temperatures. With temperature dependent upon load density and compact composition, Fansteel depends upon experience for the right temperature . . . upon Speedomax H for control reproducibility. Rugged, compact and completely reliable, this controller continuously regulates power input to moly heaters . . . holds furnace temperature well within specified limits. Speedomax H is providing the same dependable control on numerous heat treat processes . . . is helping produce both process economies and a quality product. *Whatever your heat treat, it'll pay you to investigate Speedomax H!* For details, contact your nearest L&N office or write 4957 Stenton Ave., Phila. 44, Pa.



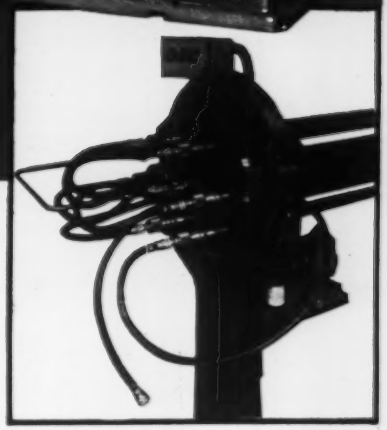
"H" C.A.T. control brings furnace from 900 to 1300 C in 16 minutes without overshoot or hunting. Magnetic amplifiers are conveniently mounted on panel back.

LEEDS NORTHRUP
Instruments Automatic Controls • Furnaces

PRODUCTION MACHINERY

GREENLEE

MULTIPLE FEED-OUTS...



Removable fittings attach air lines to the stock reel tubes. A vacuum pump withdraws the piston when restocking. Push-button control panel is provided for starting and stopping.

A Natural

on Greenlee Air-Feed Automatics

Feed Out Stock to 16½"
Eliminate Pushers and Feed-Out Cams

Greenlee Air-Feed Automatics offer you a 3-way profit advantage:

1. Maintenance and change-over time is reduced by eliminating stock pushers, feed tubes and feed-out cams.
2. Stock can be automatically air-fed to position in one or more machining stations permitting two or more pieces per cycle.
3. Multiple feed-out flexibility enables you to finish machine a variety of pieces that ordinarily demand costly second operation setups.

If you are running into production headaches on a specific job, Greenlee may be able to adapt an "Air-Feed" to solve your problem. See your Greenlee Distributor.

Write for your copy of Catalog A-405 — first step on the way to more profitable production with Greenlee Automatic Bar Machines.

• • •

Greenlee Standard and Special Machine Tools

Multiple-Spindle Drilling and Tapping Machines

Transfer-Type Processing Machines

Six and Four-Spindle Automatic Bar Machines

Hydro-Borer Precision Boring Machines

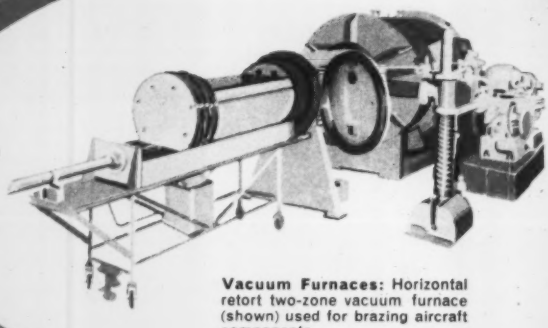
Die Casting Machines

GREENLEE BROS. & CO.

1741 MASON AVE.
ROCKFORD, ILL.

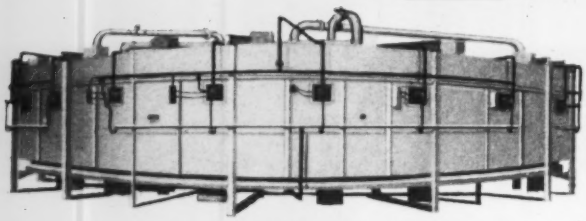
Wherever industry needs heat . . .

There's LINDBERG equipment just right for the specific job

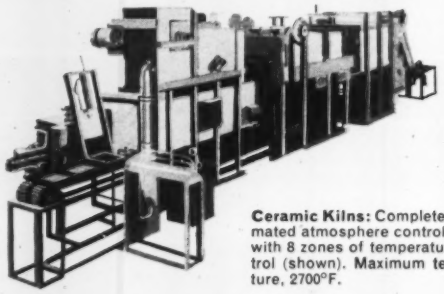


Vacuum Furnaces: Horizontal retort two-zone vacuum furnace (shown) used for brazing aircraft components.

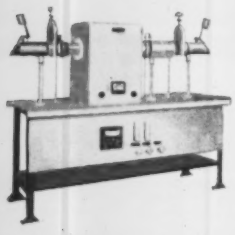
Cyclone Tempering Furnaces: Batch type fuel-fired tempering furnace (shown). Famous in metal treating industry for years.



Rotary Hearth Furnaces: Doughnut type field-installed gas-fired furnace (shown) with capacity of 13,000 lbs. per hour.

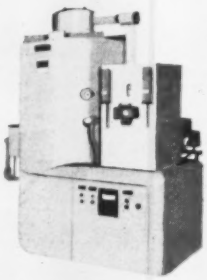


Ceramic Kilns: Completely automated atmosphere controlled kiln with 8 zones of temperature control (shown). Maximum temperature, 2700°F.

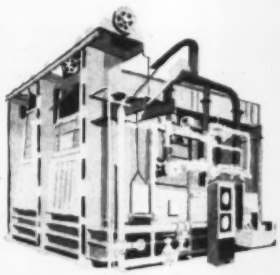


Pilot Plant Equipment: Atmosphere tube unit (shown) for ceramic research and development at temperatures up to 2750° F.

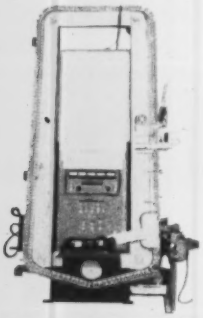
Laboratory Equipment: One-unit box furnace (shown), muffle or for non-oxidizing atmosphere with temperature range to 3000° F.



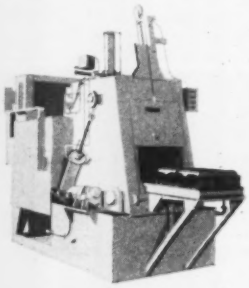
Atmosphere Generators: Hyen generator (shown) for endothermic atmospheres. Generators for all required atmospheres.



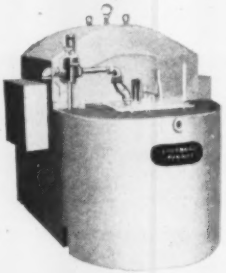
Aluminum Reverberatory Furnaces: Twin-chamber melting and holding furnace (shown) with 45,000 lbs. capacity.



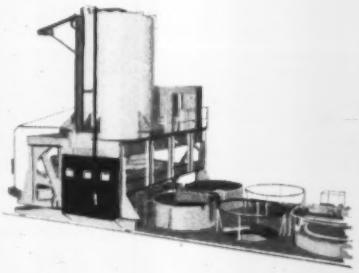
High Frequency Units: Vertically designed, completely automatic "HF" unit (Shown) for aluminizing automotive valves.



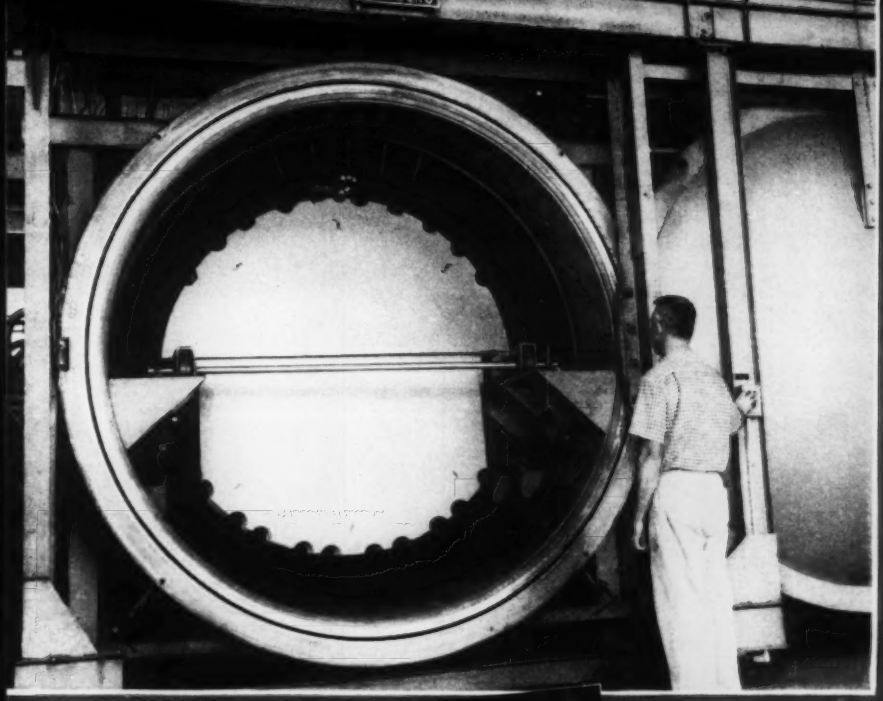
Automatic Carbonitriding Furnaces: Automated integral quench type (shown) with CORRTHERM electric elements.



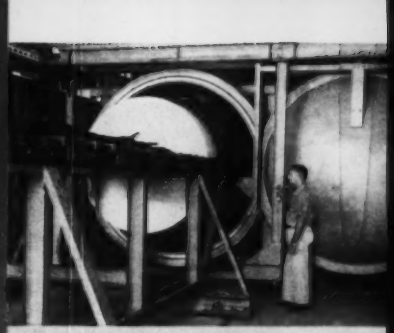
Melting and Holding Furnaces: Electric resistance furnace (shown) with capacities of 750 lbs. to 1500 lbs.



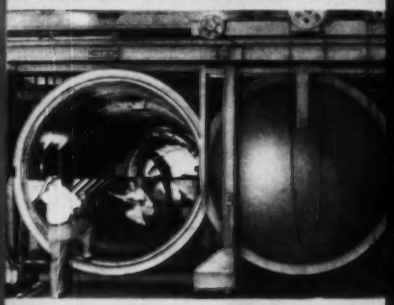
Gantry Type Furnace: Vertical, controlled-atmosphere, drop bottom, hardening furnace. Complete installation field-installed by Lindberg.



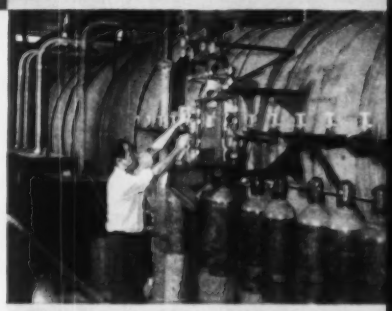
Lindberg-Designed



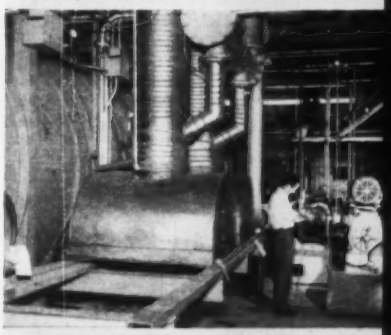
6 feet in diameter, the furnace easily takes large titanium sheets.



Total furnace length is more than 40 feet.



After vacuum cycle, inert gas is introduced into chamber to assist cooling.



Specially designed pump maintains vacuum of less than one-millionth of an atmosphere.

Large Capacity Vacuum Heat Treating Furnace Improves Titanium Quality, Saves Money in Aircraft Manufacture

Here is an outstanding example of Lindberg's ability to apply a basic furnace design to the requirements of a specific job. This vacuum furnace was designed for a leading aircraft manufacturer to heat treat large sheets of titanium. In operation it reduces the hydrogen content of the metal from 500 parts per million to 50 parts per million or less, in a maximum time of 6 hours. And this improvement in quality is achieved with a corresponding reduction in production costs. The furnace has a temperature range up to 2100° F. and operates in a vacuum of less than one millionth of an atmosphere. A unique internal cooling system makes the furnace adaptable for brazing stainless steel honeycombs, a new development in aircraft manufacture.

Lindberg equipment and planning can help you find the answer to any problem of applying heat to industry. We cover the field, heat treating, melting and holding, tempering, brazing, enameling furnaces, ceramic kilns, high frequency units, and are in the ideal position to recommend the equipment most suitable for your needs. This can be factory built or field-installed in your own plant, fuel-fired or electric. Consult your local Lindberg Field Representative (see the classified phone book) or get in touch with us direct. Lindberg Engineering Company, **2441** West Hubbard Street, Chicago 12, Illinois. Los Angeles Plant: 11937 South Regentview Avenue, at Downey, California.

heat for industry

CAMBRIDGE METAL-MESH BELTS give you the low-cost, continuous production you need to beat competition in the '60's!

Metal products of all types move through sintering, brazing, annealing, quenching, washing or hardening operations faster—and without costly manual handling. Uniformity is high because heat, gases or liquids flow through the belt and around the product for thorough treatment.

Superior belt design and manufacturing techniques save on operating cost, too, by giving longer belt life, fewer repairs. Belts can be made heatproof, coldproof, corrosion resistant—in any mesh, weave, metal or alloy—with any side or surface attachments.

Call your Cambridge Field Engineer now. He'll be glad to discuss any aspect of Cambridge Belts—from manufacture to installation and service. Look in the Yellow Pages under "Belting, Mechanical". Or, write for FREE 130-PAGE REFERENCE MANUAL.

The Cambridge Wire Cloth Co.

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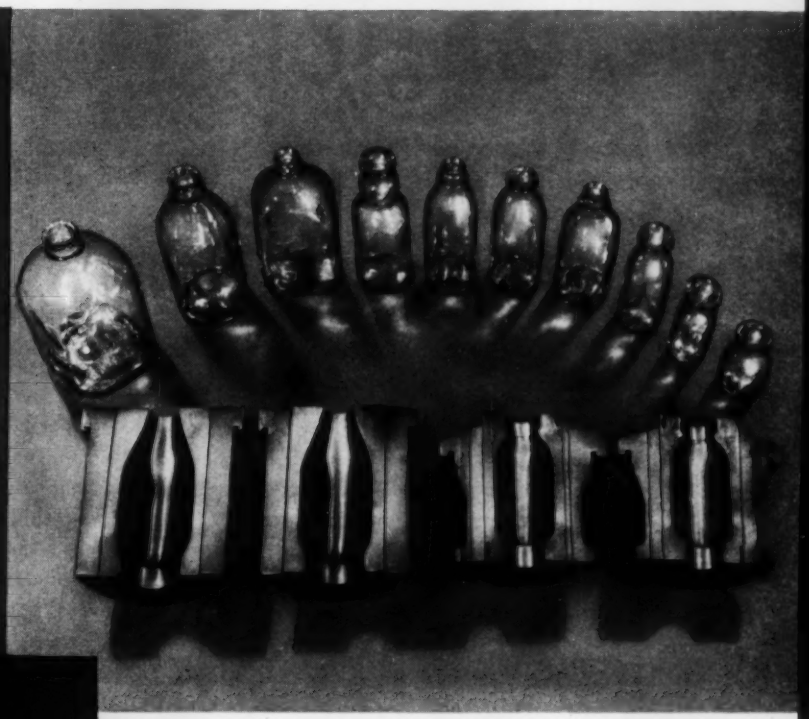
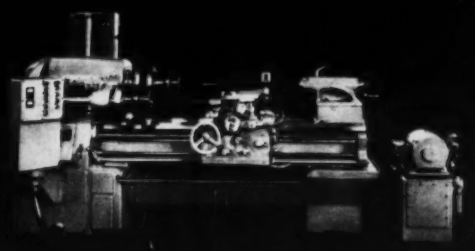
Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications

Don't Tool Up for Tomorrow's Boom with Yesterday's Lathes

MONARCH'S SPECIAL-PURPOSE LATHES OF TOMORROW...





1..The New Rotary Profile Tracer Lathe for Non-Circular Cross-Section Work

Up to *three times* more productive than equipment now in common use! Hand finishing drastically reduced! This new Monarch says "Lower Costs" two ways—on circular or non-circular cross-section work, such as the bottle molds above.

It has speed and accuracy that's only been a dream till now. Featuring the new Monarch super-sensitive electro-hydraulic tracer, it delivers accuracy of duplication of ±.001" when the tool is traveling at a 100" per minute rate. At only a slight increase of error, tool travel up to 300" per minute is possible.

Stylus deflection pressure is a low 1½ ounces. Electrical amplification of its movement instantly translates work contour change into hydraulic slide movement.

As you see, the master spindle is mounted at the front of the machine for ease of setup and operation. There's a positive gear drive from the headstock spindle through a quadrant-mounted idler which may be adjusted to eliminate any backlash between the lathe spindle and the master.

Want your costs to plunge downward? If that isn't worth a letter of inquiry—what is? *The Monarch Machine Tool Company*, Sidney, Ohio.

Monarch
TURNING MACHINES

IF IT CAN BE TURNED, THERE'S A MONARCH TO DO IT BETTER AND FASTER

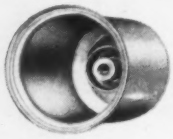
MUELLER BRASS CO. OFFERS 7 WAYS TO PRODUCE YOUR PART

Mueller Brass Co., because of its diversified manufacturing facilities that encompass a wide range of fabricating methods, is in the unique position of being able to offer you, the purchaser, an intelligent, unbiased analysis and recommendation of the best, most economical method by which your particular part can be produced. As the result of over 40 years' experience, the "Methods Analysis Department" has at its command complete knowledge of the advantages and limitations of each production process. After receiving detailed knowledge concerning the end use of the part, material specified, conditions under which it must operate and other pertinent factors, these analysis engineers make their recommendations. Every detail is considered. In many cases, methods analysis engineers recommend a simple design change that makes practical a much more economical method of production. This technical service, offered only by Mueller Brass Co., is given to each individual inquiry and is your assurance that you will get the best product at the best price . . . made the one best way . . . by Mueller Brass Co.

Send today for free technical literature on any one or all of the seven fabricating methods.

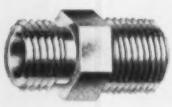
FORGINGS

Production equipment is available to produce press, hammer or cored forgings of any practical shape in sizes ranging from a few ounces to 150 lbs. in brass, bronze, aluminum and magnesium in 27 standard, as well as special, alloys.



COLD-PREST® IMPACT EXTRUSIONS

Mueller Brass Co. has complete machinery for producing Cold-Prest impact extrusions of aluminum, copper, brass, bronze and steel. Extrusions up to 28" in length are possible, depending on wall thickness and other design details. Parts can be designed having ribs, flutes, splines or bosses . . . with multiple wall diameters and with uniform or tapered wall sections.



SCREW MACHINE PRODUCTS

Mueller Brass Co. has one of the world's largest automatic screw machine departments fabricating both ferrous and non-ferrous custom parts. We can produce an infinite variety of shapes and sizes from ⅛" to 3¼" in wide range of free cutting and specialized alloys. Complete facilities for all secondary and finishing operations, as well.

POWDER METAL PARTS

Mueller Brass Co. can supply precision Sinteel® powder metal parts in wide range of sizes and metals at high production rate. Parts available from iron, brass and copper alloys. Parts may be ordered with such characteristics as self-lubrication, controlled porosity and good electrical and magnetic properties.

MADE IN U.S.A. TO THE STANDARDS OF AMERICAN INDUSTRY

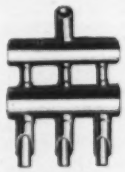
MUELLER BRASS CO.

STEEL

...and our methods analysis service helps you determine which is the best ...and most economical method

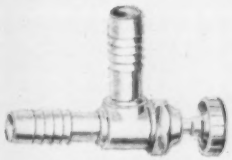
SAND CASTINGS

We specialize in the production of pressure-tight red brass castings. We utilize both metal match plate and wood patterns. Facilities include tool room and pattern shop, electric melting furnaces, high capacity core room and both bench and floor molding equipment to handle wide range of sizes.



FORMED COPPER TUBE

Mueller Brass Co. has modern facilities for forming seamless copper tube into a multitude of shapes. Forming methods used include bending, spinning, expanding or swedging, upsetting, flaring, flattening, beading and grooving, drilling and piercing, machining and joining. Formed copper tube coils are also available as single, double, spiral and serpentine shapes.



PLASTIC INJECTION MOLDING

Injection molding of plastic parts is still another process offered by the Mueller Brass Co. Parts are molded from such plastics as—nylon, polyethylenes, polyvinyl chloride, styrenes, linear acetal, chlorinated polyether, polycarbonates or polypropylene, dependent on part application.

MAN FROM MUELLER BRASS CO.

Since only Mueller Brass Co. can produce your part by all the methods, only the Man From Mueller Brass Co. can give sound advice on the one best method of production. Over 40 years of research, engineering, manufacturing and marketing experience stands behind him. When you are specifying and purchasing fabricated metal parts, call in the MAN FROM MUELLER BRASS CO.

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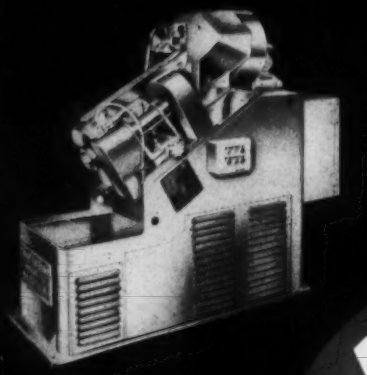
PORT HURON 26, MICHIGAN

COLD HEADING MACHINERY

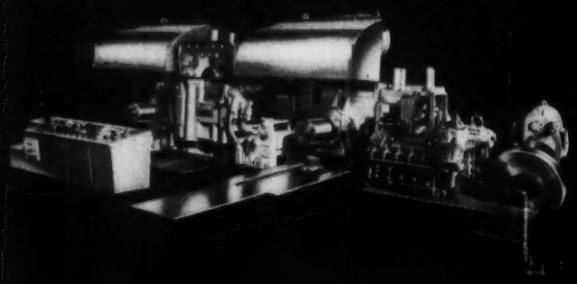


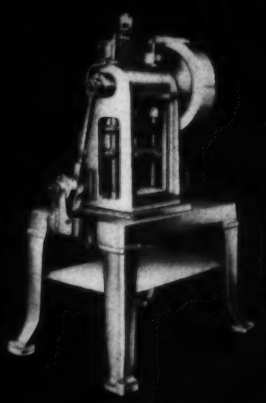
EYELET, SLITTER & WIRE MACHINERY

WATERBURY FARREL

MACHINERY BUILDERS

ROLLING MILL MACHINERY





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Matching that growing manpower, is VEPCO's growing electric power . . . 1,700,000 kilowatts now, due to top 2,000,000 kilowatts by 1961.

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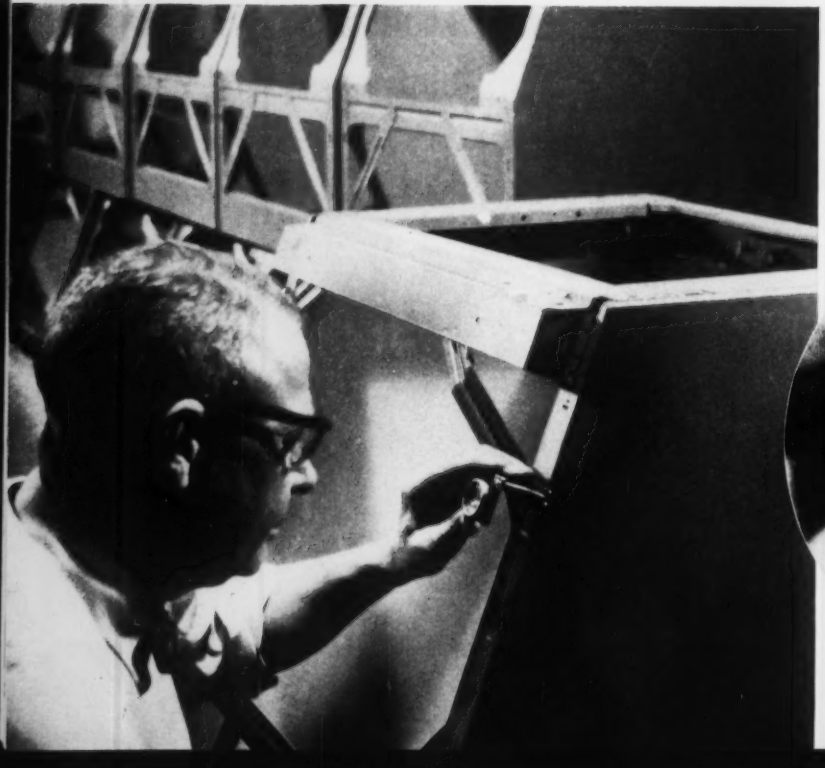
Clark P. Spellman, Mgr., Area Development, Electric Bldg., Richmond 9, Va., MI 9-1411

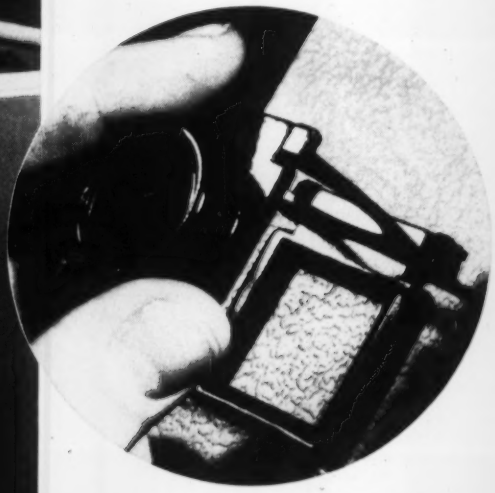
Pittsburgh Steel's patterned sheet gives leather-appearance to the new custom furniture-styled L-1000 Laundromats shown here on way to final inspection.

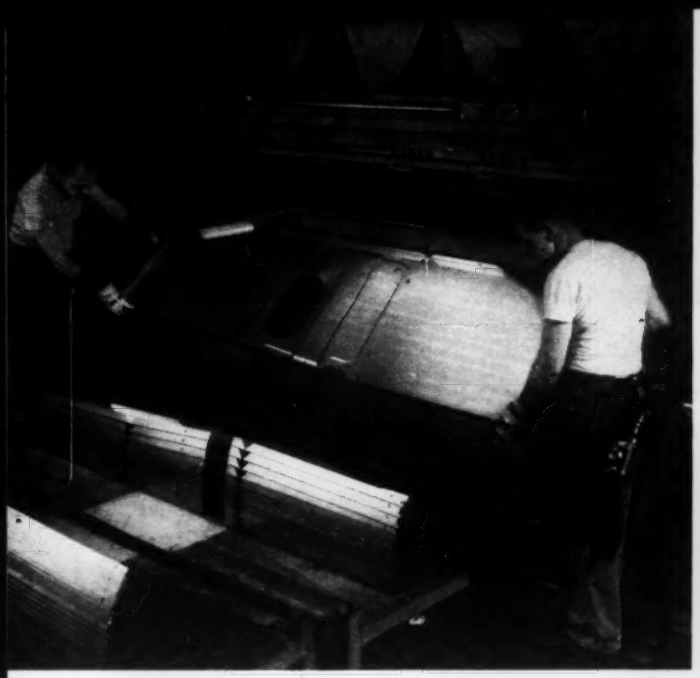
An Industry First . . .

Pittsburgh Steel Has Beauty of Leather On Westinghouse 'Furniture-Styled Twins'

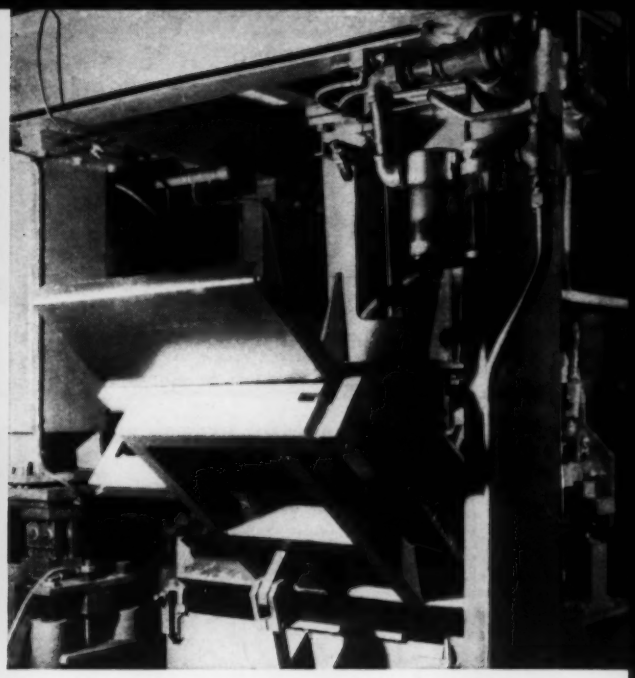


Soft, rich finish on a group of Laundromat shells is checked at one of the many quality inspection points. Close-up shows detail of the L-1000's pattern.





Fully as formable as Pittsburgh Steel's regular plain sheets, the new patterned sheets are put through Westinghouse's normal production process at Mansfield, Ohio.



Top quality in sheet, plain or patterned, is needed to serve Westinghouse's automated equipment. Here, patterned sheet is formed into the shell of the L-1000.

First time pattern-rolled steel available in wide steel sheets

Wide patterned sheet steel—a new product and a Pittsburgh Steel Company "first"—has been put to work by Westinghouse Electric Corporation on its new line of custom "furniture-styled" appliances.

Wider than any patterned sheet available until now, the new sheet is designed and finished to appear like fine-grain leather. It's being used as the outer shell on Westinghouse's newly introduced L-1000 Laundromats and D-1000 automatic electric dryers.

Pittsburgh Steel's Allenport (Pa.) Works is the steel industry's first producer of patterned, flat-rolled carbon steel in widths up to 48 inches—about twice the width previously available.

Patterned sheet is available in coils or cut lengths, in either commercial or drawing quality. As flat, formable and drawable as Pittsburgh Steel's plain sheet, super-wide pattern-rolled steel goes through Westinghouse's regular production process without special machine changes.

Patterned sheets are given 27 piercings and notchings, in addition to a four-side flange. At Westinghouse, the rolled-in pattern emerges unmarred, even on corners and bends.

Next step is welding and then the sheet is formed into the appliance's shell. After bonderizing, the shell gets a sprayed-on enamel coat which is baked. Soft wood-toned in color, the enamel helps emphasize the attractive, but rugged, leather-like finish.

• **Shape of Tomorrow**—But surface is only one quality standard Pittsburgh Steel meets. The Shape of Tomorrow theme in Westinghouse appliances requires clean, pronounced lines. As a result, bends and corners are sharper on the L-1000 and D-1000 models. This imposes extra requirements for uniformity of hardness so that the patterned sheets won't overbend or spring back.

Flatness specs must be met rigidly so that the finished appliance isn't plagued by an "oil-canning" effect.

Westinghouse has automated so much of its production sequence at the Mansfield, Ohio, plant that steel suppliers know gauge and dimension specs must be held rigidly. If they aren't, rejects and scrap losses would mount rapidly.

Pittsburgh Steel's patterned sheets are performing so well at Westinghouse and in other applications that a promising future is being predicted for the product, especially in the automotive, appliance and building industries.

Patterned sheets are suitable for any application where decorative appeal is needed, in addition to steel's strength, formability and economy.

Produced on one of the steel industry's most modern sheet mills, patterned sheet complements Pittsburgh Steel's full line of hot and cold-rolled carbon steel products.

Supplementing this product is cold-rolled strip steel produced by the Thomas Strip Division, Warren, Ohio, whose line also includes pattern-rolled strip—plain or with a variety of protective and decorative coatings. These include copper, brass, nickel and zinc.

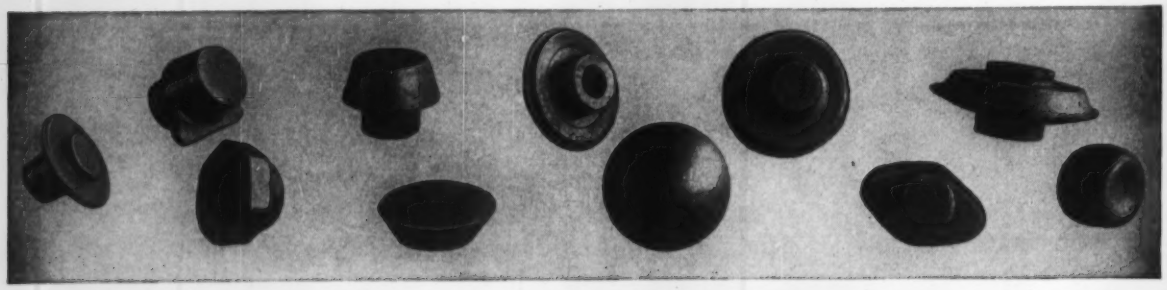
If you are a manufacturer of a product made from flat-rolled steel, you can't afford to pass up potential improvements in your production process or the sales zip this imaginative patterned steel can give your product. Contact any of the district sales offices listed on this page.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

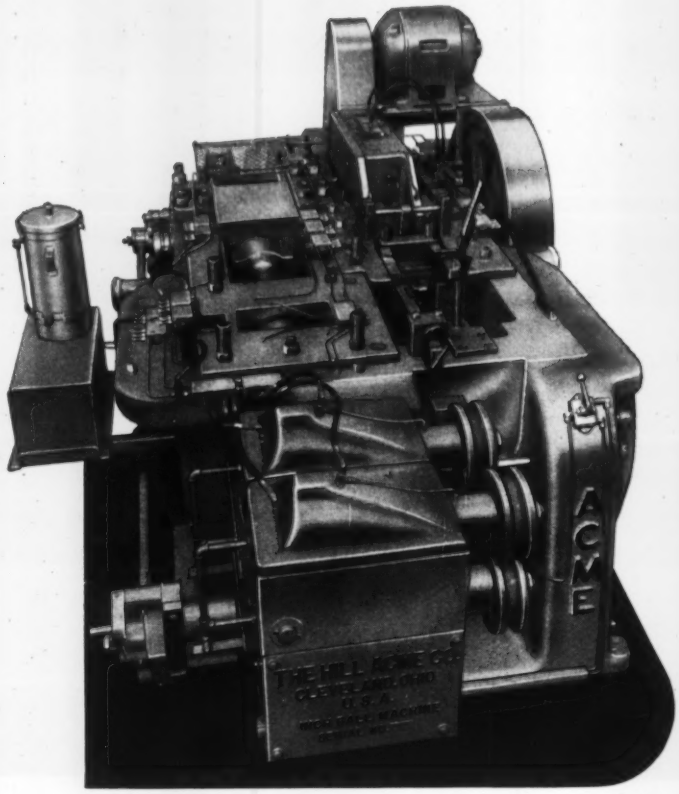
DISTRICT SALES OFFICES

Atlanta	Cleveland	Detroit	Los Angeles	Pittsburgh
Chicago	Dayton	Houston	New York	Tulsa
			Philadelphia	Warren, Ohio



Typical Shapes Produced by ACME Single Blow Forging Machines

SINGLE BLOW FORGINGS AT 135 PER MINUTE



● One man operating this ACME single blow solid die forging machine is producing 135 one inch hard steel balls per minute from 11/16" stock. Automatic feed rolls carry bar stock at proper speed for maximum efficient operation. Adequate safety devices prevent jamming of the die.

ACME solid die forging machines are rated according to the size ball they will forge. Machines are built from 1" to 5" capacity.

Complete information is given in Bulletin SB-57.

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HILL ACME TOOLS FOR INDUSTRY

Manufacturers of: **"ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BAR-BILLET SHEARS "HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES • SHEAR BLADES**

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FEDERALOY L-200 Lead-base babbitt

This group of sleeve bearing alloys permits the engineer to design for all conventional commercial applications. At the same time, he can meet his performance and cost requirements.

Each of these alloys has been thoroughly proved and accepted by leading engine builders. Our production of millions of sleeve bearings each year assures you of the highest quality, efficiency and economy. Complete engineering service. A copy of the "Sleeve Bearing Design Guide" will be sent free on request. Address:

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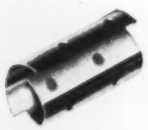
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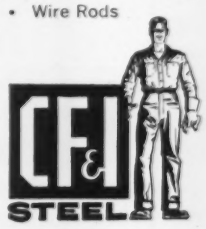

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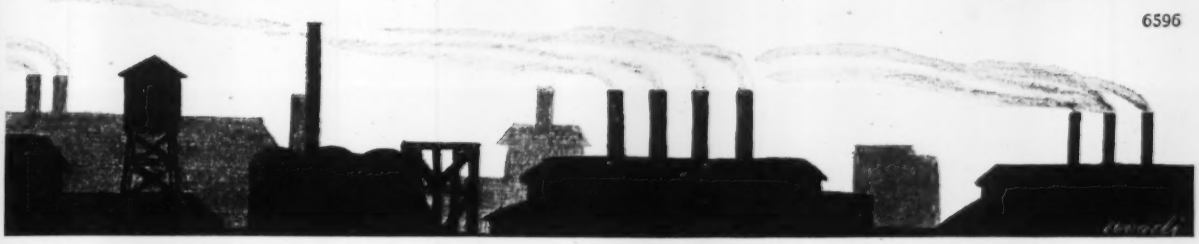
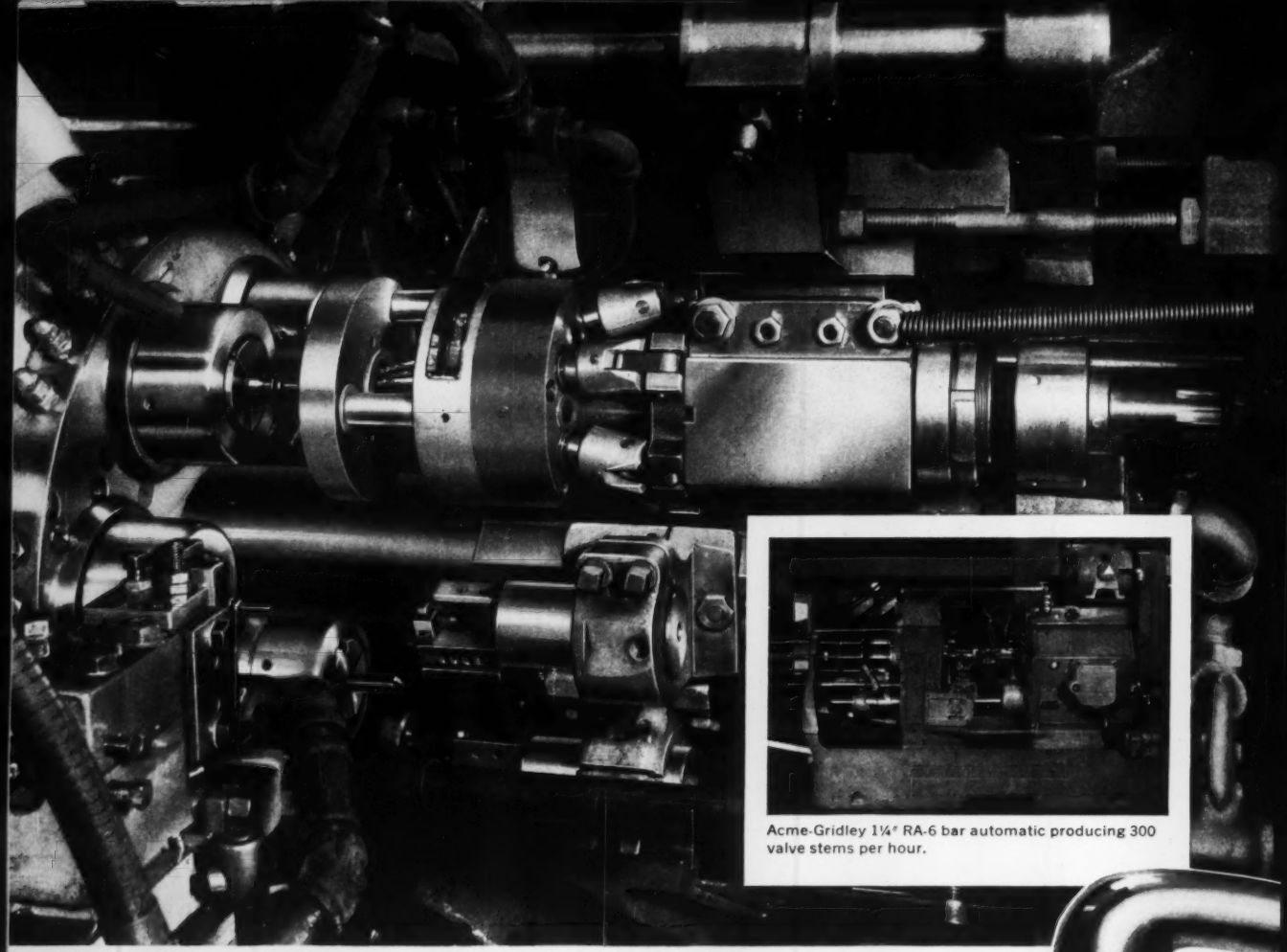




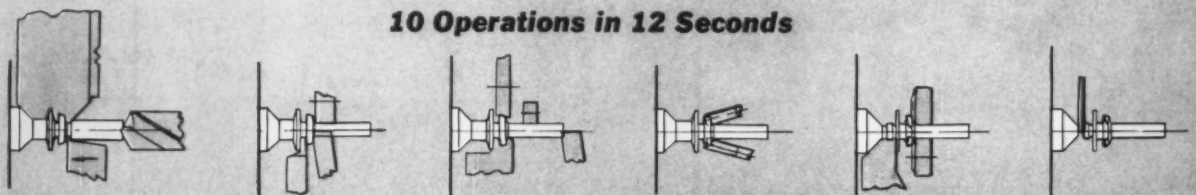
Acme-Gridley 1¼" RA-6 bar automatic producing 300 valve stems per hour.

Special Namco-designed multiple end milling attachment in the 3rd position.

When Tolerances and Finish Looked Economically Impossible

AMERICAN-STANDARD TURNS TO ACME-GRIDLEY...

10 Operations in 12 Seconds



6th position Rough form rear —rough turn stem —spot drill

1st position Finish turn stem face large diameter

2nd position Shave—face and chamfer stem end

3rd position Stop spindle— mill six slots

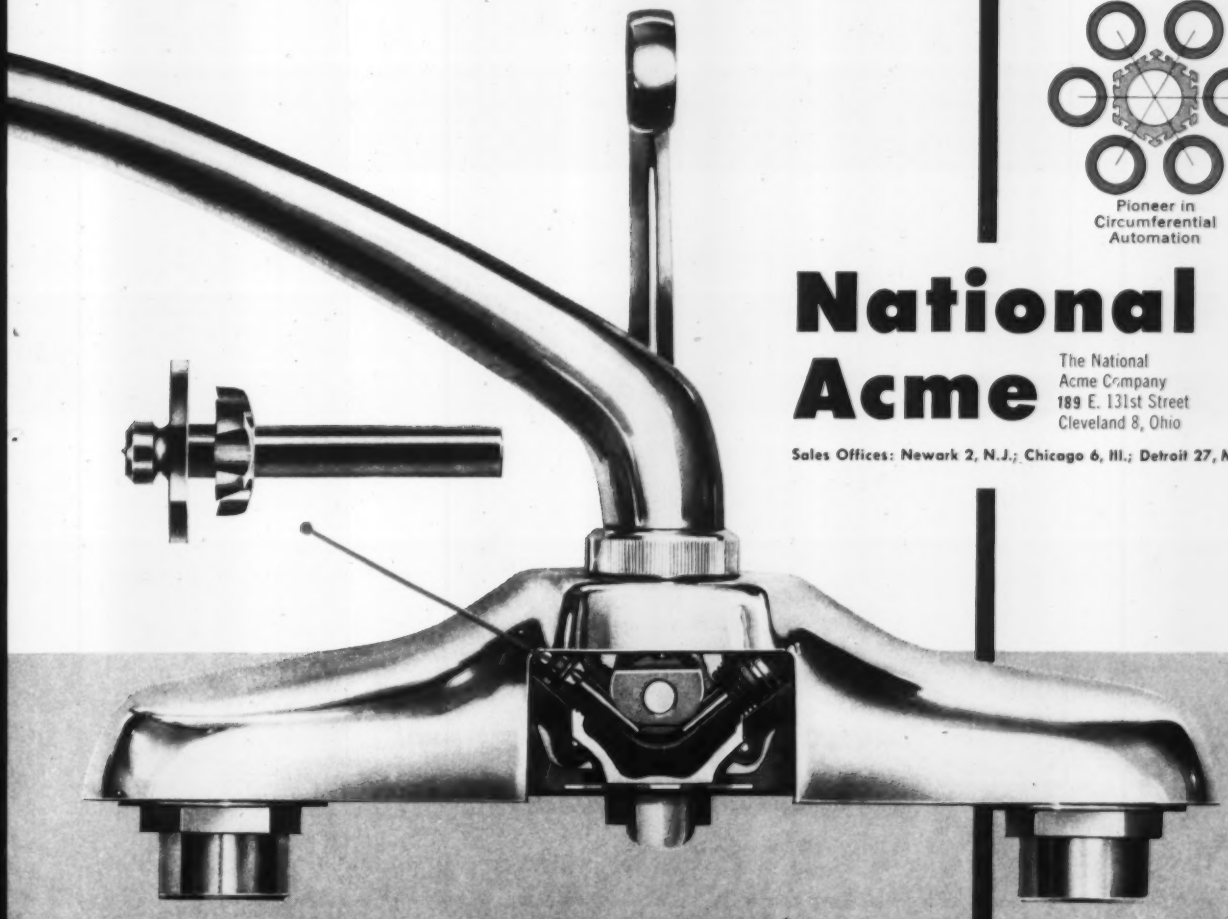
4th position Start spindle— burnish stem— form back end

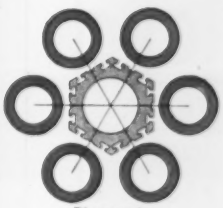
5th position Cutoff

COMPLETED IN A SINGLE SETUP . . . this hyseal valve stem is a vital component in American-Standard's single-lever mixing faucet. Production by other processes would have meant a two-piece assembly. It would have been economically impossible to meet the high standard of quality and exacting tolerances maintained on this company's products.

Ten operations, including multiple end milling of six half-holes on a 15° angle, were performed on this 303 stainless steel piece in 12 seconds. Rigid specifications required a 20 microinch finish and limits of .002 t.i.r. between seating surface and end of valve stem.

Advanced spindle stopping design and the inherently accurate indexing of Acme-Gridleys, assure proper alignment of the work with the standard and special tool attachments. This, together with wide open tooling zones and independently operated tool slides, helps assure the solution of "impossible" jobs at National Acme. Write or ask one of our representatives for the complete story on the industry's most modern approach to your cost reduction problems.





Pioneer in Circumferential Automation

National Acme

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Sales Offices: Newark 2, N.J.; Chicago 6, Ill.; Detroit 27, Mich.

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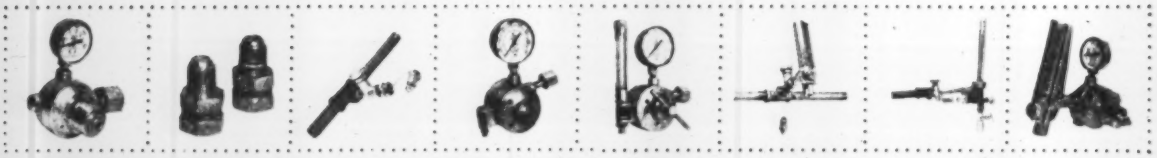

Single-Stage Fixed Pressure Regulator Low in cost . . . sturdy. No flow rate tampering.

Flow Adapter—Exact gas flow needed. Prevents tampering . . . saves.

"B" Station Valve for Flow Adapter—reliable shutoff. Compact, sturdy, versatile.

Fixed Pressure Two-Stage Regulator—exact gas flow needed. For two operations.

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THERE'S A VERSATILE SAGINAW SCREW TO SOLVE EVERY ACTUATION PROBLEM

ACTUATES and POSITIONS WITH OVER 90% EFFICIENCY

- **POSITIONS MORE PRECISELY** than acme screws, hydraulics or pneumatics. Can be held within .0005 in./ft. of travel.
- **SAVES POWER** with over 90% efficiency. Permits much smaller motors, far less power drain, simplifies circuitry.
- **SAVES SPACE/WEIGHT** because Saginaw b/b Screws are compact. Allows smaller, lighter motors, gear boxes. Eliminates cumbersome auxiliary equipment.
- **DEPENDABLE PERFORMANCE.** Saginaw Screws are far more reliable than hydraulics. Gothic-arch grooves, yoke deflectors, multiple circuits increase assurance.
- **TEMPERATURE TOLERANCE.** Normal operating range is from —75°F. to +275°F. With selected materials, up to +900°F.
- **LUBRICATION LATITUDE.** If lube fails, the Saginaw b/b Screw still functions with remarkable efficiency.

The men who want to exact the maximum potential from their products specify the remarkable Saginaw Screw! The unequalled efficiency and precision of the Saginaw b/b Screw goes a long way to eliminate design and production problems. It actuates your product (large or small) more smoothly, simply, surely, and very often more cheaply than other methods. For full details, write or phone today for your free 1959 engineering data book on Saginaw b/b Screws and Splines.

A FEW TYPICAL USES OF SAGINAW SCREWS:

- Airplane & Missile Components
- Photography Equipment
- Bumper Jacks and Lift Trucks
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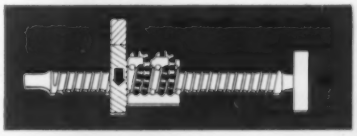
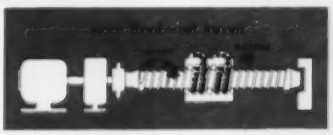
- Circuit Breakers
- Die Table Positioners
- Farm Equipment and many, many other applications



SCREW TRAVELS: When rotary motion is applied to the b/b nut, the screw glides along its longitudinal axis on rolling steel balls, converting rotary force and motion to linear force and motion with unprecedented efficiency.

NUT TRAVELS: When rotary motion is applied to the screw, the b/b nut glides along the axis of the screw on rolling steel balls, converting rotary force and motion to linear force and motion with *4/5 less torque* than acme screws.



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Saginaw ball bearing Screw

SAGINAW STEERING GEAR DIVISION OF GENERAL MOTORS • SAGINAW, MICHIGAN

WORLD'S LARGEST PRODUCER OF BALL BEARING SCREWS AND SPLINES

THE OTHER TURN

LOOKS LIKE JOHN'S FURNACE WILL BE HIGH IN TONNAGE AGAIN THIS WEEK.
THAT MAKES 4 OUT OF 5 HEATS HE'S HAD TO GIVE A DRINK BEFORE THE SWEDE WOULD TAP.
HE TRIED HARD TO SELL THAT HEAT TO THE SWEDE, BUT CAN'T EVEN GET THE SHAKE ROD OUT OF THE WICKET HOLE!
THANKS TO
GENE KLIMA, 1ST. HELPER
NO. 30 OPEN HEARTH
BETHLEHEM STEEL COMPANY
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The Ore Hog

WHY NOT DESCRIBE YOUR OPEN-HEARTH CARTOON IDEA AND SEND IT ALONG TO US?

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

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Metalworking Outlook

March 16, 1959

Recession-Spurred Steel Import Boom Continues

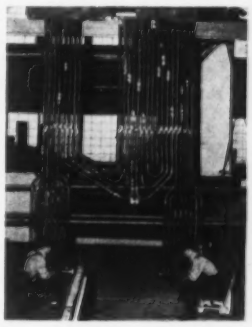
Recession woes of the steel industry last year were aggravated by a 30 per cent increase in imported steel products. Steel imports were valued at $212.5 million; tonnage of round steel wire imported was seven times the 1953 level. U. S. industry blames lower foreign labor costs for price differentials (Page 59); but a U. S. labor spokesman charges that domestic price policies are to blame (Page 60).

Tempers Grow Short in Common Market

Familiar rumblings of nationalistic rivalry are coming out of Europe, especially from the six members of the Common Market. Strained relations among member countries and nations outside the treaty organization are resulting in policy disagreements among members. The market's governing body, the Commission for the European Economic Community, considers itself a new world power; members, particularly France, are trying to get back some of the power they delegated to the commission. Among other European producers that aren't market members, hostility of the British is especially pronounced. They consider the market discriminatory.

Hedge Buying Quickens Tubemakers' Recovery

Specialty tubemakers expect to parlay a "terrific rush" of hedge buying this quarter into a year of moderate recovery; prospects are for a 12 to 20 per cent pickup for the industry. But over-all demand is growing, too. One producer says: "If you start with 50 per cent operations, you can add 25 points for higher consumption and 20 points for hedging." The press of imported pipe is being felt mostly in pressure tubing, with some foreign producers underselling by 25 per cent (Page 145).



Business Spurred by Berlin Tension?

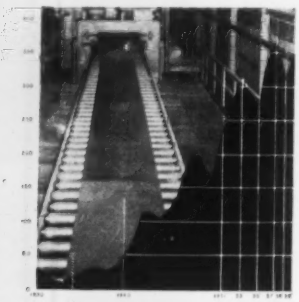
Exaggerated or not, the war talk is an added spur to the business recovery. Government inquiries, but not orders, are above normal, especially in in-

Technical Outlook—Page 113

Market Outlook—Page 143

dustries like stamping. And domestic activity shows some signs of the psychological stimulus. Defense spending will go higher, because of inflation and complex missiles, not because of Berlin. But there's no intention of changing defense order schedules beyond those already planned.

Conveyor Builders See 25% Gain



Conveyor manufacturers are pushing an ascending sales curve that should be 25 per cent above 1958's level by yearend. Hard selling and generally better business conditions should account for the comeback, say optimistic respondents to a STEEL survey. Equipment is going mostly to plants in metalworking, chemical, and food processing. One question: If prices go up, will buyers accept them? (Page 61).

Chrysler Says 'Maybe' on Small Car

Chrysler Corp., which admittedly spent "tens of millions of dollars" on tooling for its economy car, still denies that a decision has been made to market it. President L. L. Colbert told dealers in New York that the decision would be made by "late summer," presumably after GM and Ford plans are firm. Mr. Colbert said prototypes are on the test track; it's described as a 6 cylinder, six passenger car with a front mounted engine. Its wheelbase is 105 to 110 in.

The Best Place To Improve

Your best places to improve productivity are in the nonmanufacturing areas. The production line has been pretty thoroughly plowed. Look at the intangibles—labor relations, research, engineering—and you'll find fertile places to improve productivity, advises Henry W. Spitzhoff of the Cleveland management consulting firm, Robert Heller & Associates Inc. Needed is a fresh approach like this to help keep inflation from running wild (Page 103).

Rails Ask Realistic Tax Amortization

Daniel P. Loomis, president of the Association of American Railroads, calls for drastic liberalization of tax amortization rules so the roads can make much needed capital equipment outlays. Mr. Loomis says: "The average tax writeoff period for railroad capital facilities is a wholly unrealistic 40 years." Comparisons: An airplane is depreciated over five years, a heavy

truck in seven years. Mr. Loomis called it significant that in 1955, the last big year for five-year amortization writeoffs, railroads ordered 157,407 freight cars, eight times the total ordered by the industry in 1958. (For more about depreciation, see Page 66.)

Small Fry's Savvy Worth Having

Thinking of breaking into a new field, taking on a new product line, or integrating operations more fully? If the answer's "yes," don't overlook acquiring the savvy and experience of a small, specialized firm. Here's a case history (Page 64) of how The Anaconda Co. has done just that. Also revealed is what makes its fledgling aluminum company believe it can compete with the giants. The new firm thinks it will double its net worth in four to eight years.

Tin Plate Makers Adopt Silicon Rectifiers

Steel Co. of Canada Ltd.'s new electrolytic tin mill, now under construction, will use direct current power converted by silicon rectifiers. Long term operating economies are expected. Other major tin plate manufacturers in Canada report they are switching to the silicon rectifier. They require only half the space normally needed and make higher operating temperatures possible.

Electric Iron Smelting on Way Up

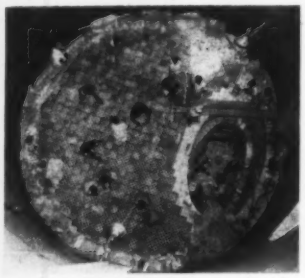
You may be able to profit from the swing to electric furnaces for iron smelting. They don't require large capital investment; they can be put into operation quickly, with a rapid return on invested capital. Electric furnaces are flexible. Capacity can be small, medium, or large, depending on where they're used. Proper applications can permit use of lower grade coal, lignite, or peat to refine low grade iron or other ores (Page 122).

Steel Employment Climbs, So Do Wages Costs

Employment of hourly and salaried people in steel was 554,636 in January, up 54,000 from the low point of last May and up 7000 from December. The January workweek for wage earners was 38.1 hours, vs. 34.2 last May and 37.3 in December. The American Iron & Steel Institute reports that the hourly-salaried payroll hit $332,350,807 in January, up $7 million from December. The average hourly payroll cost for wage earners was $3.306

in January, against $3.291 in December and $3.042 in January of last year. Not included are fringes which averaged 33.2 cents per hour in 1958.

India Is Boosting Its Steel Capacity



India, keeping abreast of world expansion of steel capacity, hopes to boost its annual production to 6 million tons by 1961. Tata Iron & Steel Co. Ltd., Jamshedpur, is leading the way. It has hiked its annual production capacity to 2 million tons. The government has completed new blast furnaces at Rourkela and Bhilai. India's biggest problem: Inexperienced engineers (Page 63).

Ford Scientist Predicts Orbiting TV

Dr. Michael Ference Jr., director of Ford Motor Co.'s scientific laboratory, predicts that the U. S. will have a missile mounted television camera orbiting the earth within one year. He thinks that within three years we will have missiles in orbit around the moon.

February Ingot Output Best Since May, 1957

Despite its fewer working days, February's steel ingot production was the largest since May, 1957. The American Iron & Steel Institute reports the total at 9,603,000 net tons, vs. 9,317,385 tons in January and 5,782,323 tons in February last year. Operations last month averaged 84.8 per cent of capacity. Output in the first two months this year hit 18.9 million tons, compared with 12.5 million for the same months in 1958.

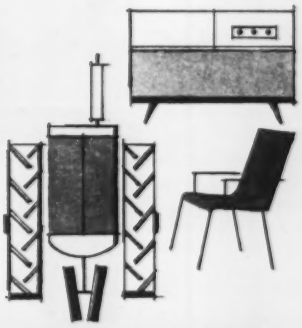
Pennsy Considers Conveyors for Steel Industry

The Pennsylvania Railroad is discussing conveyor applications that could be used by the steel industry in handling its coal and ore. Late this month the railroad may announce the action it expects to take. The Pennsy denies that it will acquire Riverlake Belt Conveyor Lines Inc., a subsidiary of Akron, Canton & Youngstown Railroad. Riverlake has been trying unsuccessfully for ten years to persuade the Ohio legislature to grant it rights of eminent domain to run an overland cargo-carrying conveyor belt from the Ohio river valley to northeastern Ohio.

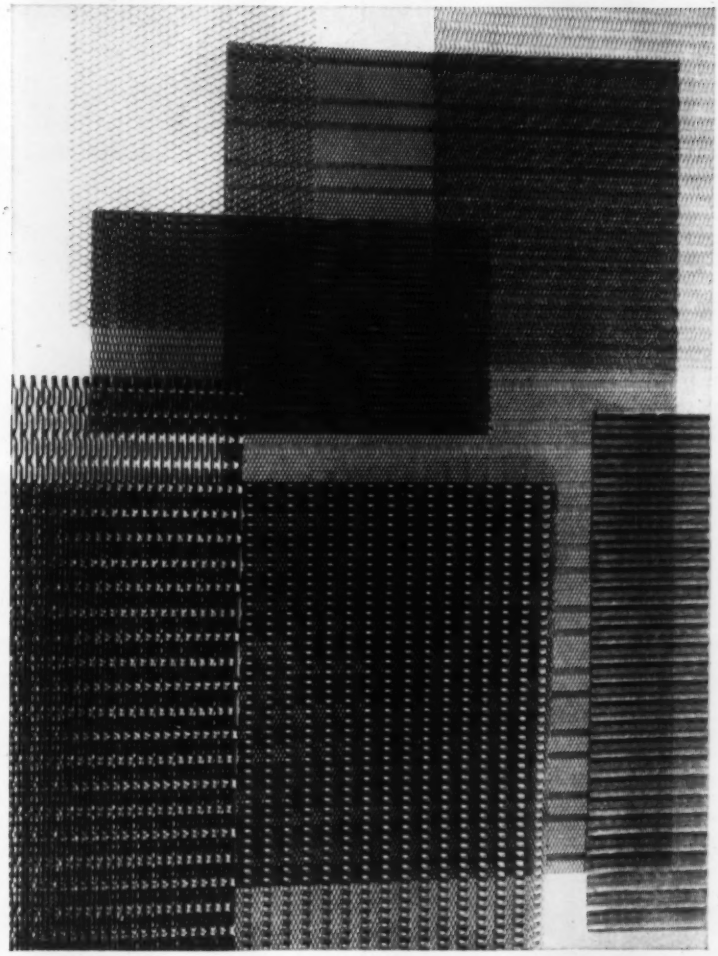
Straws in the Wind

W. P. Greenawalt, president of the International Ball & Roller Bearing Corp. organized last year, says that the Kyo-Seiko Co., a Japanese ball and roller bearing manufacturer, will enter the U. S. market . . . Chrysler President L. L. Colbert estimates the company lost 100,000 sales since January because of the Pittsburgh Plate Glass Co. strike. He hopes for sales of 1 million units this year, vs. 750,000 last year . . . Britain's first lord of the admiralty told Commons that the first British atomic submarine, *Dreadnought*, will be powered with machinery supplied by Westinghouse Electric Corp. The British submarine will be similar to the USN Skipjack class; technical assistance will be given by *Skipjack's* builders, Electric Boat Div., General Dynamics Corp.

Inland "job-tailored"
Cold Rolled Sheets work better



product: EXPANDED METAL



problem:

the production of expanded metal panels for a wide variety of products ranging from automobiles to air conditioners, tractors to phonographs, stoves to patio furniture, television receivers and lawn mowers. These to be fabricated from decorator designs in an almost limitless range of complexity. Equipment, created specifically for the purpose, functions at highest efficiency and economy with coil steel which is cut and expanded. The often enormous stretch of quite narrow strands could cause breakage and rejection of the entire piece.

solution:

the problem presented was overcome by "job-tailored" Inland Drawing Quality Aluminum-Killed Steel. The steel not only took punishment of severe expansion and pattern formation, but provided an excellent surface for all subsequent finishing operations.

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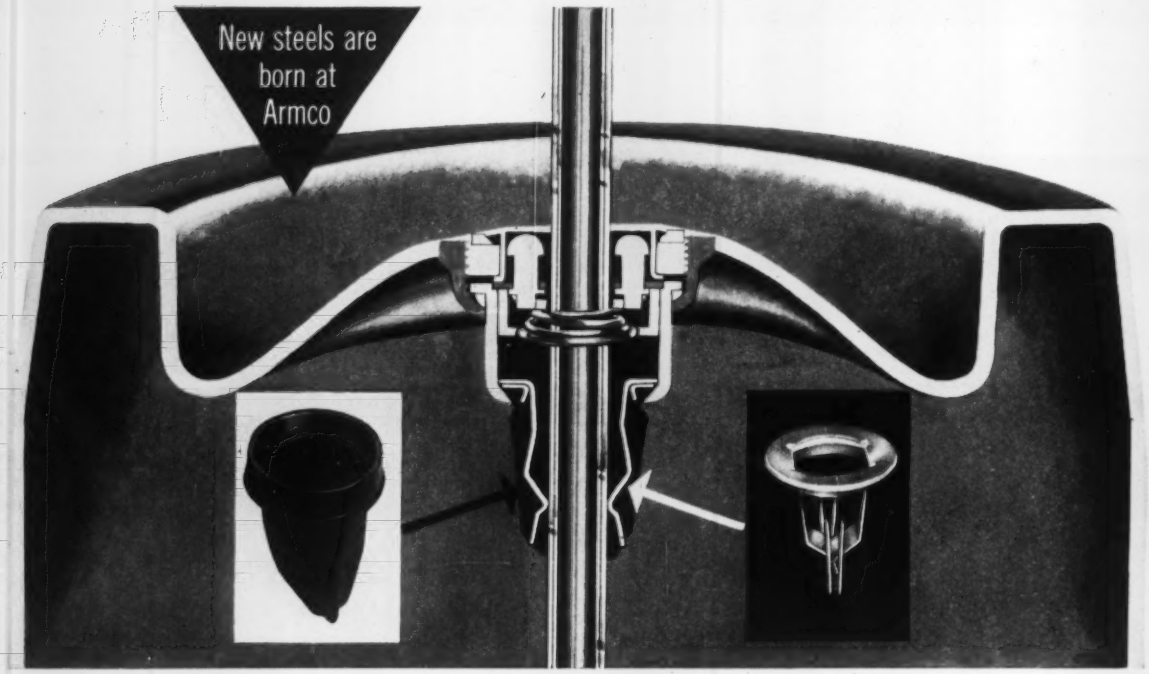
Cold Rolled Sheets



How Seal Spring of Special Armco Stainless
Helps Keep Draft Beer Fresh

An unrelenting "squeeze" from a spring clamp made of special Armco 17-7 PH Stainless Steel helps this new beer keg seal maintain a leak-proof barricade against contamination.

The 17-7 PH spring is the "muscle" inside a molded rubber sealing unit that keeps a pressure-tight grip on the tap rod from the moment it's inserted. When the rod is removed, the spring snaps the seal shut. Thus draft beer is protected from air and contaminants throughout tapping and dispensing. And the same keg seal can be used time and again.

Many materials were tested by the designers of this unique tapping system—Champion Safe Tap Company, Cleveland, Ohio. Armco 17-7 PH Stainless was selected for the vital spring clamp because of its excellent spring properties and great resistance to relaxation despite repeated flexings.

Need corrosion-resisting springs?

Corrosion resistance is another top advantage of precipitation-hardening Armco 17-7 PH Stainless. This, combined with its strength and ease of fabrication, accounts for the growing use of this special grade for exacting spring applications.

Why not consider it for spring parts in *your* products? Armco 17-7 PH is produced in sheet, strip, plate, billets, bar and wire. For more information, fill in and mail the coupon.

Armco Steel Corporation
1529 Curtis Street, Middletown, Ohio
Please send more information about Armco 17-7 PH Stainless Steel. We make _____

Name _____ Title _____
Firm _____
Street _____
City _____ Zone ____ State _____

ARMCO STEEL

Armco Division • Sheffield Division • The National Supply Company • Armco Drainage & Metal Products, Inc. • The Armco International Corporation • Union Wire Rope Corporation • Southwest Steel Products

What Price Imports?

A couple of months ago, a foreign vessel unloaded 3000 tons of concrete reinforcing bars at a Great Lakes port not more than a stone's throw from an American steel plant making the same product.

The shipment was only a trickle in the larger stream of steel that is flowing into this country via the Great Lakes and Atlantic, Gulf, and Pacific Coasts.

The imports typify an acute problem, not only for steel producers and distributors but also for all the "hard goods" industries. Because of rising costs, two things are happening:

1. American industry can no longer compete effectively for export business.
2. Foreign manufacturers are taking a larger and larger slice of U. S. business.

Exports of steel mill products, as an example, dropped from 4.4 million tons in 1957 to 2.3 million tons in 1958, or about half.

Imports increased from 1.2 million tons in 1957 to 1.6 million in 1958, or about a third.

Foreign steel is disrupting the markets for many products. For instance, imports of nails and staples came to over 200,000 tons. In comparison, American plants supplied 417,000 tons. Specialties like bolts and nuts are arriving at a rate of over 2000 tons a month. Some 1000 tons of wire rope are coming in each month.

Prices are $5 to $40 a ton under those of the American market; and they fluctuate frequently and unexpectedly.

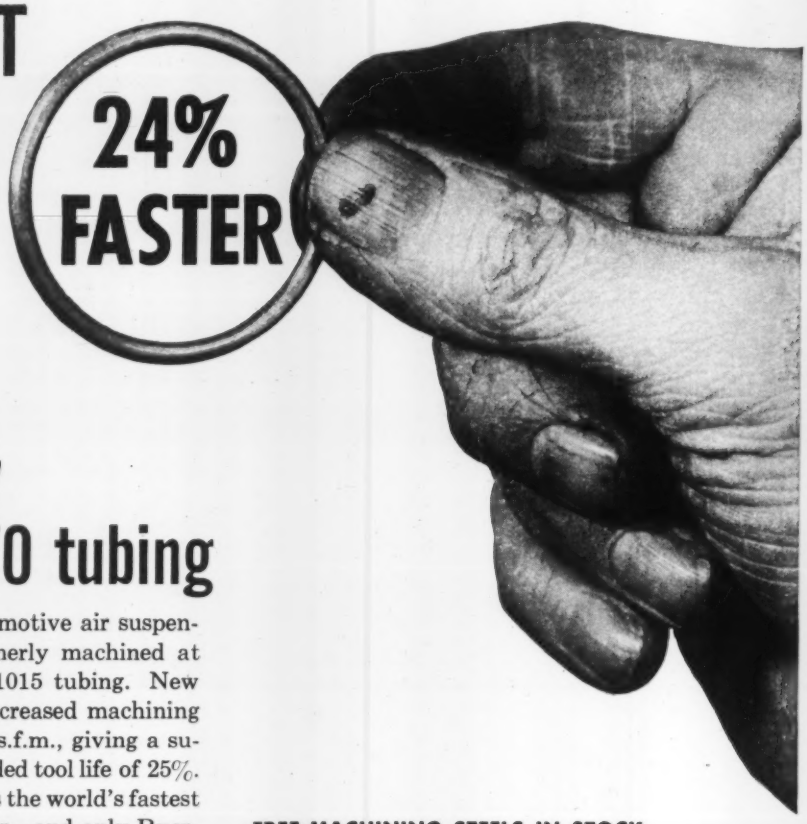
What about the future? A delegation of Japanese steel executives now in the U. S. reports that 427,000 tons of 2 million tons exported by Japan in 1958 went to this country. They say that Japan must export to live and must depend on U. S. markets even more in the future. The same statement applies to European countries.

Foreign producers now can match quality and delivery on many products and have the advantage of lower costs.

Under our government's policy of freer trade, the problem of individual companies in meeting foreign competition is one for which there is no easy solution.

Irwin H. Such
EDITOR-IN-CHIEF

THIS PART MACHINED 24% FASTER



from new Ledloy 170 tubing

This part for an automotive air suspension system was formerly machined at 131 s.f.m. from MT-1015 tubing. New Ledloy® 170 tubing increased machining speed by 24% to 163 s.f.m., giving a superior finish and extended tool life of 25%.

Ledloy 170 tubing is the world's fastest machining steel tubing—and only Ryerson has it available from stock. It's a cold-drawn, seamless product of low carbon analysis with .15% to .35% lead added. Sizes available to date: 1" to 2½" O.D. with maximum ⅜" wall thickness.

Ask your Ryerson representative for complete details on Ledloy 170 tubing —and new Ledloy 375, world's fastest machining bar stock. These two newest additions to Ryerson stocks supplement the already large supply of screw steels and leaded alloys for all applications.

FREE-MACHINING STEELS IN STOCK

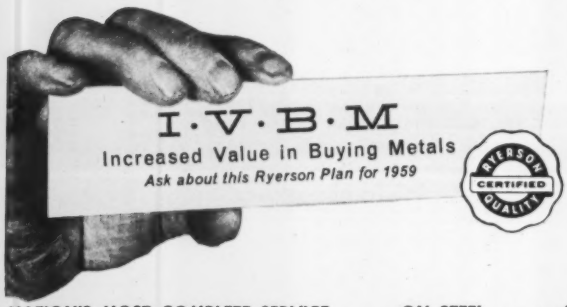
Ledloy® steels and screw stock—Ledloy 300 rounds to 4", squares to 1½" and hexes to 3". Ledloy 375 rounds to 1" and hexes to ⅝". Also on hand—all your requirements for C1213, MX1213, and leaded and non-leaded C1117 and C1141.

Carbon steel tubing—All the popular sizes and wall thicknesses used by automatic screw machine shops are ready for shipment, including new Ledloy 170 tubing.

Alloy bars—Complete selection of leaded alloys, including Ryerson Rycut® steels—fastest machining in their carbon ranges.

Stainless bars and tubing—Here, too, our stocks are the nation's largest, including easy-machining Types 303 and 416 in rounds, hexagons and squares.

Carbon steel plates—New EZ-Cut®-lead-bearing plates (hot rolled, low carbon manganese).



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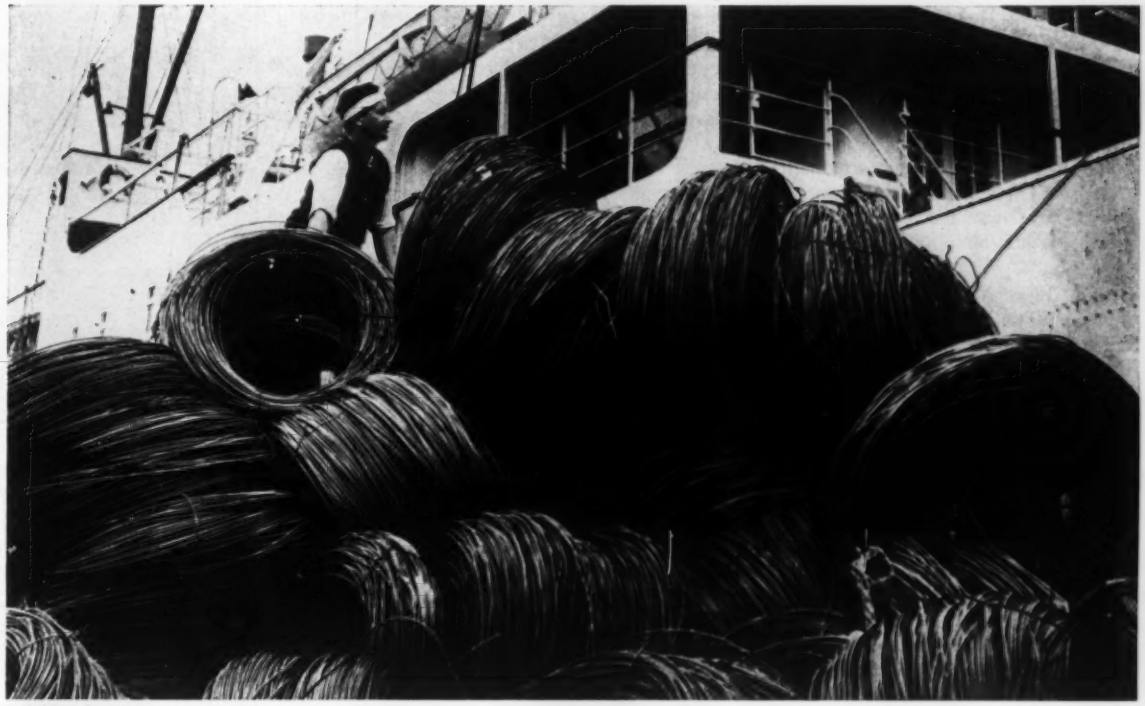
NATION'S MOST COMPLETE SERVICE . . . ON STEEL . . . ALUMINUM . . . PLASTICS . . . METALWORKING MACHINERY

SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST



Kurt Orban Co. Inc.

Recession Boosts Boom in Imports

THE RECESSION had a two-way impact on the American steel market last year: Imports increased 30 per cent, while domestic shipments fell 25 per cent.

Last year's imports of steel were valued at $212.5 million. Rods and finished wire products (about 630,000 tons) accounted for $84 million. Imports of wire rods were triple the 1957 rate; the tonnage of round steel wire was more than seven times higher than the 1953 figure (see table, Page 60).

Until last year, the U. S. exported three to four times more steel than it imported; the ratio dropped to less than 2 to 1 in 1958.

• **Changed Market** — Import emphasis used to be on heavy carbon products. The trend has swung toward lighter goods, beginning with nails and merchant wire products. Demand for rods and round steel wire has broadened in the last 15 months. In 1950, imported nails took 7 per cent of domestic sales; by 1957, the figure was up to 23 per cent. Imported woven wire fencing accounted for 1 per cent of domestic sales in 1953; four years later, sales of domestic producers dropped 15 per cent; imports increased tenfold.

In the case of wire rods and finished steel wire, the quality of imports is much improved; most of the foreign tonnage is produced with postwar equipment. But the foreign machine operators get only about one-third as much pay as their U. S. counterparts.

• **Price War**—A relatively small, but steady, volume of Swedish high carbon rods (which are drawn into quality wire) continues to be imported.

The biggest increase in rod and round steel wire imports was enjoyed by mills in Central Europe, Germany, and Luxembourg.

The foreign price differential has forced many producers of wire goods to buy imports to meet competition. One New England wire manufacturer had rod costs of $160 to $165 a ton when his chief competitor began to buy European carbon rods at $115 to $120 per ton. The $45 per ton advantage soon forced the manufacturer to buy foreign semifinished material.

Other comparisons: A 100 lb keg of American nails sells at $10.30; European nails of like quality can be obtained for $6.90. Barbed wire produced in Dusseldorf, Germany, costs an Ohio jobber $40 per ton less than comparable wire made in Cleveland. Japanese mills import scrap from this country, manufacture it into finished steel products, and undersell American producers by $29 a ton.

For union reaction to this situation, please turn page.

USW Official Slams Tariffs

AMERICAN STEEL wire producers should meet foreign competition by revising their policies, not by relying on increased tariffs. That's the gist of a strongly worded statement to the U. S. Tariff Commission by Meyer Bernstein, United Steelworkers' international affairs representative.

The commission is holding hearings on a petition from four U. S. wire producers (Atlantic Steel Co., Continental Steel Corp., Keystone Steel & Wire Co., and Northwestern Steel & Wire Co.). They seek an investigation of damage being done to their industry by imports (STEEL, Dec. 1, 1958, p. 38).

In his countering statement, Mr. Bernstein says: "The high and sticky pricing policies of the American steel industry have pushed the breakeven points so low for most U. S. companies, that substantial profits can be made even during periods of sharply curtailed operations." He also claims: "The American steel industry in general, and these four companies in particular, have deliberately chosen to base their earnings on high unit prices rather than large volume."

• **Open Door**—He contends that the alleged policies have made it possible for companies abroad to bear packaging and shipping charges, pay tariffs, and still be able to sell at a lower price than the domestic producer chooses to offer.

What can U. S. companies do? Mr. Bernstein suggests that their salvation is in their own hands. He says: "Let these companies modernize their mills, adopt realistic pricing policies, and go after the business as they did in years gone by." He adds: ". . . an increase in the tariff would only intensify the problem and lead to new difficulties."

• **Labor Cost Differences** — Mr. Bernstein argues that labor cost differentials are not the central problem, though he notes that foreign competitors do have an advantage. "It is true hourly wages paid by foreign competitors are substantially lower than the hourly wage scales in effect in American steel mills. The figures given by the companies are not complete because they do not adequately show the comparative magnitudes of the various 'fringe benefits,'" he says. His view: In most European countries, particularly in steel areas, nonwage costs represent 40 to 60 per cent of hourly earnings. In the U. S. steel industry, such fringes account only for about 10 to 15 per cent of wages.

But even after all factors are taken into account, Mr. Bernstein admits that "hourly wages and related benefits abroad are still substantially less than those paid in the U. S." For example: In 1957, all inclusive labor costs at the Niederrheinische Huette in West Germany amounted to only 10.9 per cent of sales. Mr. Bernstein cited similar labor costs for U. S. companies: Atlantic Steel Co., 38.4 per cent of sales; Continental Steel, 32.4 per cent; Keystone Steel & Wire, 30.7 per cent; and Northwestern Steel & Wire, 27.1 per cent. The average for all American steel companies in 1957 was 36.3 per cent, he said, compared with 18.8 per cent for the German steel industry as a whole, not counting the Saar, which was 17.2 per cent.

Mr. Bernstein charges that the proposed tariff changes would result in foreign countries doing more business with Iron Curtain countries. In effect, he says: "The real purposes of the Reciprocal Trade Act will be defeated—by preserving the trade and already high profits of a single industry from foreign competition. We will actually be reducing trade in other commodities and thereby harming other industries, including steel."

ROD AND WIRE IMPORTS

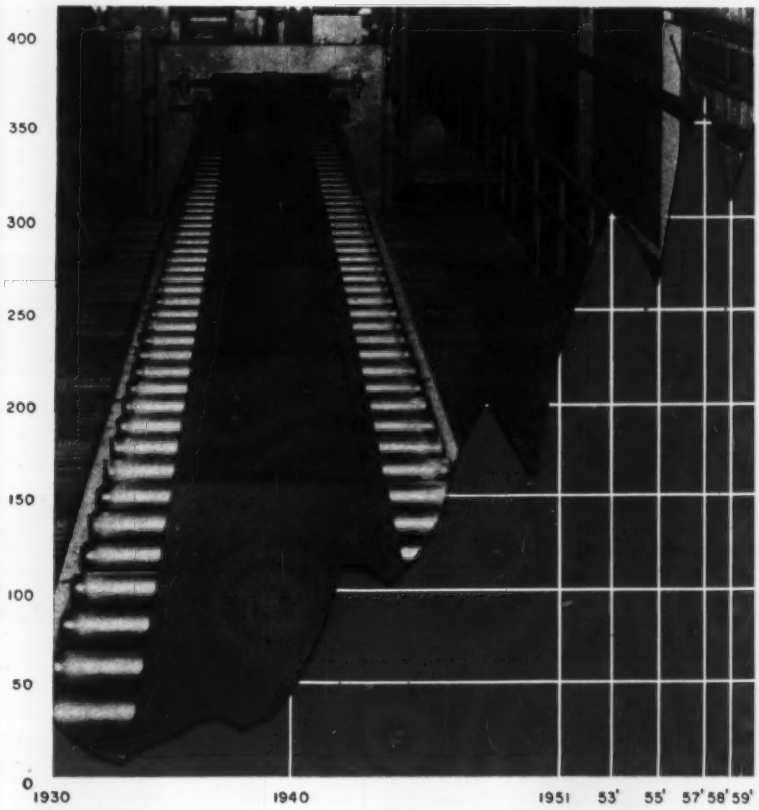
(Net tons)

	Wire Rods	Wire Nails	Barbed Wire	Round Wire & Steel Wire	Wire Rope-Strand	Cotton & Other Ties
*1958	185,155	194,771	63,862	128,125	14,928	17,624
1957	54,369	134,838	63,775	70,764	10,814	13,865
1953	65,415	39,265	16,090	17,485	4,326	46,242

Source: American Iron & Steel Institute.
*Estimated.

Conveyor Sales Rebound

Shipments (millions of dollars)



1959 estimated by STEEL.
Data Source: Conveyor Equipment Manufacturers Association. Photo Source: Empire-Reeves Steel Corp.

LOOK FOR conveyor sales to climb this year. Manufacturers hope to recoup a good share of the volume they lost in 1958. Support for the comeback is solidly in metalworking, chemical, and food processing fields.

High optimism is apparent in industry replies to a STEEL survey: 85 per cent of the respondents expect dollar volumes to increase about 25 per cent over 1958's level. None anticipates a decline. (Normal growth is 15 per cent a year.) The recovery will come about through "hard selling and improved business conditions," says Planet Corp., Lansing, Mich. Hewitt-Robins Inc., Stamford, Conn., and most other manufacturers say inquiries are mounting. Booked sales are also improving, says Conveyor Div., American Monorail Co., Cleveland.

What happened in 1958? Nearly all companies dropped an average of 22 per cent in sales volume and only 15 per cent enjoyed increases.

• **Impasse Looms**—Prices may be a problem this year. What transpires will depend to a great extent on the outcome of steel labor contract talks. If steel prices go up, conveyor manufacturers will want to pass along the higher costs. Most companies have no margin to permit absorbing price increases and anyhow there is some doubt that customers would accept higher prices, says an industry observer.

• **Where They Stand** — Backlogs average 100 per cent of their year-ago level. The range is 25 to nearly 200 per cent. "Since the first of the year, we have eaten farther into our backlogs," say some firms. Plants are operating at 45 to 100 per cent of capacity with an industry average of about 80 per cent. Prab Conveyors Inc., Detroit, expects this year to be best for placing equipment in existing plants. Most of the other companies queried concur. Systems for new plants are running a slow second. Added push: "As various industries work out of the recession, they will again purchase capital goods," says Mathews Conveyer Co., Ellwood City, Pa.

The biggest sellers are the perennial champions—belt, roller, and wheel conveyors. Chain Belt Co., Milwaukee, believes: "More companies are discovering that bulk materials can be transported continuously and for greater distances economically with belts than with other forms of transportation." A major producer reports that he has a new type of belt conveyor idler which is popular in all markets. Made of flexing steel wire rope with molded neoprene discs, it's used for handling bulk materials—especially in foundries. Logan Co., Louisville, says that pre-engineered belt conveyors are the fastest growing because of low prices and quick delivery on the units.

• **Trends** — The building block theory is being put to work in this industry, and companies are looking at the potential in making standardized subassemblies that will fit engineered systems. Another factor: More emphasis on using conveyors in places where men can't go—in heat, fumes, dust, and other contaminated atmospheres.

• **Foreign Markets** — Exports and imports pose no particular problems for the industry. One source cautions: "Exports may become more important than any of us realize. Companies now hesitate to get into foreign markets because of red tape and the fact that it is hard and costly to sell engineered equipment like conveyors." Efforts pay off

more per sales dollar in U. S. sales than in foreign, says one firm. Despite this situation, a number of firms have plants abroad. South America, Mexico, and Canada continue to be the major foreign outlets for conveyors and some companies are taking a look at sales potentials in India and Africa as well.

• **Development**—Conveying people is coming to the fore again. More than 30 moving sidewalks are established in this country—some have been operating five years. They have safely handled probably 50 million people. (Escalators are not classified as conveyors.) A market for moving sidewalks exists wherever people must be moved in mass: Railroad stations, airports, and shopping centers are naturals.

• **The Makers Speak**—Some manufacturers are experiencing seasonal fluctuations. Allied Steel & Conveyors Inc., Detroit, notes that business is slow but should get better when auto plants make model changeovers in midsummer. Other influences: Ohio Conveyor & Supply Co., Findlay, Ohio, believes that the trend toward automation and increased labor costs will develop more of a market for tailored units. A. B. Farquhar Div., Oliver Corp., York, Pa., reports that industry is more cognizant of possible savings and that cost reduction potentials are greatest in systems, large or small. "The general trend to tightening of purchasing as seen during 1958 will be eased this year," says Cambridge Wire Cloth Co., Cambridge, Md.

Explains Speedways Conveyors Inc., Buffalo: "Conveyors, whether simple or elaborate, are an investment in cost reduction; they're a prime consideration for economic stability in every type of business. It's an axiom that must underline the proper merchandising of conveyors."

• **Greater Speed in Future**—"No matter what product, process, or industry you are talking about, if there are changes, then the old conveyor system will probably be obsolete," says one industry source. The industry has the tools to speed things far beyond what was dreamed of ten years ago, he comments.

Ford Offers New Tool Bits

Made of titanium carbide, the cermets will outlast tungsten carbide on some jobs, tests show. Ford will not sell the material but will license others to produce and market it

TAKE a close look at the titanium carbide tool bits developed by Ford Motor Co.

Ford researchers say they have a longer life span than bits made of imported, strategic tungsten. Dr. Michael Ference Jr., director of Ford's Scientific Laboratory, says the company will not sell the new material but will license firms to produce and market it within a year.

• **80% Titanium** — Dr. Ference calls the titanium tools "probably the most successful cermets to be produced since the development of tungsten carbides" in the tool and die grades. E. D. Marande, manager of Ford's metallurgy department, says the steel cutting grades have a hardness range of 90 to 93 Rockwell A. A nominal composition of 80 per cent titanium carbide, 10 per cent nickel, and 10 per cent molybdenum has been developed and tested for semifinish and finish machining.

• **Fine Grain**—"First efforts were directed toward understanding and controlling the factors that determine microstructure," says Mr. Marande. "The use of nickel alone results in excessive carbide grain growth during sintering. The addition of molybdenum promotes the uniform dispersion and retention of fine carbide grain size which leads to improved hardness, strength, and impact resistance."

• **Test Results**—One test involved two commercial ceramic cutting tools, a C-8 tungsten carbide, and a titanium carbide. An 8620 steel forging gear blank with a Brinell hardness of 170 to 207 was finish turned at 1040 surface feet per minute. Feed was 0.013 in.; depth of cut, 0.010 in. The C-8 cut 1090 pieces per tool corner; one ceramic cut 1232; the other, 1666. The titanium carbide cut 6317 pieces.

Several other producers offer titanium carbide tool bits. Ford says its are different because of a patented process for controlling the wettability factor to achieve a constant grain size.

The bits are expected to be competitive in price with tungsten tools on a cost per piece basis.

Long Term Loans Offered

A Chicago commercial finance company will offer five year capital loans to growth corporations in the metal and machinery industries. A firm can obtain a minimum of $100,000 and a maximum of $1 million.

Commercial Discount Corp. says: "Smaller firms with good credit can usually get short term loans but find long term credit impossible to arrange. About one-half of bank refusals of loans to growth companies are due to the demand for long term loans."

Sidney Feuchtwanger, president of Commercial Discount, says the loan program will differ from underwriters' public stock issues in that no share of ownership, profits or voice in management will pass from the borrowing company.

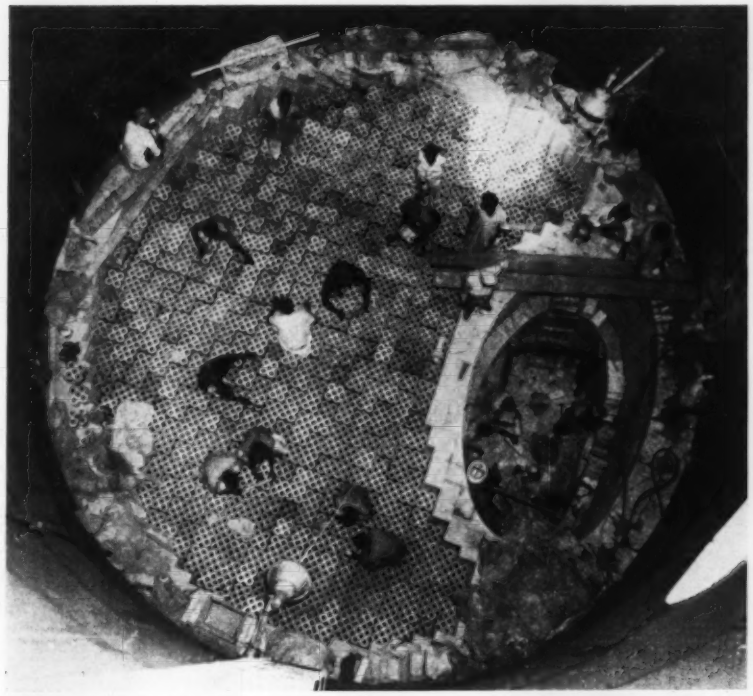
"To qualify for the program, a company must have competent management, a history of company profits and ability to repay the loan over the five-year period, expansion possibilities, and proof that the new funds will be put to constructive use."

Ore Ships Launched

Two ore ships were launched last month:

The *Revere*, second of three bauxite carriers being built for Ormet Corp., New York, was christened at Hamburg, Germany. The ship is 603 ft long and has a capacity of 25,575 long tons.

The *Herbert C. Jackson*, launched at River Rouge, Mich., joined the Interlake Steamship Co. fleet. It is 689 ft long and has a capacity of 24,000 long tons.



Masons install checker brickwork inside hot blast stove of the new blast furnace at Tata Iron & Steel Co. Ltd., Jamshedpur, India

Indian Steel Volume Rises

Its goal: 6 million tons by 1961. Capacity of Tata Iron & Steel Co. Ltd. reaches 2 million tons annually upon completion of expansion program started in 1955

KEEPING PACE with world expansion of steel capacity, India plans to boost its annual steel production to 6 million tons by 1961. Leading the drive is Tata Iron & Steel Co. Ltd., Jamshedpur. The firm has completed a project which hiked its annual production to 2 million tons of steel. Cost: $140 million.

The project included open hearth furnaces, coking facilities, a blast furnace, an in-plant railroad, a sintering plant with screening and crushing equipment (capacity: 4000 tons daily), plus sheet bar and billet, blooming, and medium and light structural mills.

Kaiser Engineers, Oakland, Calif., and its subsidiary, Kaiser Engineers Overseas Corp., contracted for the design, engineering, procurement, and construction of the Tata project. It began in December, 1955.

• **Other Plants** — Another significant step has been the completion of government owned blast furnaces at Rourkela and Bhilai. Iron production has started.

When all departments are completed, the Rourkela plant will produce plates (200,000 tons), hot and cold rolled sheets (470,000 tons), tin plate, and foundry iron (50,000 tons each).

The Bhilai operation will produce rails and sleeper bars (200,000 tons), heavy structurals (160,000 tons), medium structurals (260,000 tons), billets for rerolling (150,000 tons), and foundry iron (300,000 tons). Rourkela and Bhilai will also have byproduct plants.

• **Problem**—The biggest difficulty facing India's development of an iron and steel industry: It must rely on young engineers who have no experience. Large numbers are being trained in the Soviet Union, Germany, the United Kingdom, Australia, Canada, and the U. S.

Indian iron ore output topped 5.8 million tons last year, compared with 5.1 million tons in 1957.

U. S. Investors Aid Australian Growth

"AN INCREASING number of U. S. firms are sharing Australia's prosperity with our full approval," says John McEwen, Australian minister of trade. U. S. investments in the country total $703 million. They are expected to double within the next ten years.

Government encouragement of U. S., British, and Canadian capital investment in the Australian steel industry is being urged by Harry Hurrell, assistant national secretary of the Federated Ironworkers Union. He says the move would reduce imports.

• **BHP Monopoly** — Broken Hill Proprietary Co. Ltd., Melbourne, Victoria, has a near monopoly of Australian steel production. Despite BHP's $225 million expansion program to be completed in 1961, the country still expects an import bill of $45 million in the early 1960s.

Australia hopes to produce 3.6 million tons of ingot steel annually by 1961, up 600,000 tons from present levels. Imports this year are anticipated to reach 200,000 tons. Steel requirements should jump 100,000 tons a year in the '60s.

• **Nonferrous Front** — Aluminum consumption is 18,000 to 20,000 tons a year and rising fast. The Tasmanian government is investing $4 million in the aluminum works at Bell Bay to boost output from 12,000 to 16,000 tons annually.

In addition to expanding production facilities, further exploitation of the continent's rich iron ore and bauxite deposits is being carried out.

Anaconda Aluminum Bows in

It takes the stage as integrated producer—from basic metal, to mill products, to pie plates. The fledgling empire is built around Cochran Foil. Here's how it plans to compete

IF YOU'RE in a business facing intense competition from another product, here's a tip: Put an investment on both horses—you'll finish strong no matter which wins the race.

That's what The Anaconda Co. did when it backstopped its multimillion dollar investment in copper and other metals (see list) by becoming a producer of aluminum, the metal that some believe will quintuple in use over the next 16 years.

Other U. S. metalworking companies can probably benefit from Anaconda's experience. Here's how it became a fully integrated producer, from smelter to consumer, in four years:

• **First Step**—The company's entree into aluminum coincided with a switch in corporate attitude in 1955. That year, it changed its name from Anaconda Copper Mining Co. to The Anaconda Co. and opened a 60,000 ton a year primary reduction plant at Columbia Falls, Mont.

Anaconda's original intention was to supply its wire and cable subsidiary and its brass mill at Torrington, Conn., with pig and sell the rest of its output on the open market. It wasn't long before the company realized it would have to offer customers fabricated forms if it wanted to compete with the integrated producers.

• **Equal but Separate** — In 1956, construction was started on a $40 million aluminum rolling and extrusion mill at Terre Haute, Ind., which was to be operated by Anaconda's subsidiary, American Brass Co. While the plant was still under construction, management decided that aluminum and copper were two different animals and that forming a separate aluminum division would make more sense than putting the metal in a salesman's bag as an "also ran." Anaconda's formula: Acquire a firm with plenty of aluminum marketing savvy and experienced personnel.

• **From Pig to Pie Plates**—The philosophy led Anaconda to the Cochran Foil Co. of Louisville. Although an independent, Cochran had managed to fight its way up to the position of the country's third largest producer of aluminum foil. The marriage was consummated last April when Cochran became an Anaconda subsidiary.

In January, Anaconda took the final step and merged its three properties into the $140 million complex named the Anaconda Aluminum Co. This gives Anaconda Aluminum:

• A 60,000 ton a year primary reduction plant at Columbia Falls, Mont.

• An experimental pilot plant at Anaconda, Mont., where parent company metallurgists are studying the feasibility of beneficiating domestic clays derived from the Moscow, Idaho, area as a source of alumina.

• A 510,000 sq ft sheet and extrusion mill at Terre Haute with an initial capacity of 40 million lb yearly (80 per cent sheets, 20 per cent extrusions) and a potential output of 100 million lb. Product mix: Sheets and plates up to 72 in. wide; coiled sheets up to 54 in. wide; extrusions up to and including 8 in. circles; and drawn seamless tubing, rods, and bars.

• At Louisville, a light gage sheet and foil rolling plant, a foil laminating plant, and a rigid container plant where foil containers are fabricated.

• Another container plant at San Gabriel, Calif., which concentrates on sales to the west coast packaging industry.

• A foil laminating plant at Fair Lawn, N. J.

• Coiled sheet production facilities at the American Brass Co.'s Torrington plant.

Anaconda named Archie P. Cochran to head the complex. The founder and president of Cochran, a veteran of 40 years in aluminum, started in 1939 with an original capitalization of $340,000 and ran up the net worth of his company to $8.5 million by 1957.

• **Who Benefits** — Both Cochran Foil and Anaconda are better off for the marriage. The sales and operation knowhow of Mr. Cochran and his organization, the foil operation, and access to consumer markets were

From Copper to Aluminum

Highlights of Anaconda's Growth

1895—Commences copper production.

1914—Begins commercial output of gold, silver, arsenic, bismuth, lead.

1916—Becomes producer of zinc.

1917—Enters cadmium market.

1919—Commences production of high analysis phosphate fertilizers.

1920s—Begins commercial output of platinum, palladium, tellurium, selenium byproducts.

1940—Becomes commercial producer of indium.

1941—Begins to produce manganese.

1948—Starts up ferromanganese output.

1953—Enters uranium field.

1955—Begins aluminum production.

1957—Acquires iron ore properties near Nackina, Ont.

1958—Buys Cochran Foil Co.

1959—Integrates aluminum holdings into autonomous subsidiary, Anaconda Aluminum Co.

what Anaconda needed to become a full-fledged competitor in aluminum.

The advantages to Cochran Foil are equally as great. Explains Mr. Cochran: "As an independent fabricator, we were in danger of a price squeeze on our raw materials. We would have had to spend a minimum of $10 million to build a coiled sheet plant to serve our needs." Cochran also gets the greater marketability of the Anaconda name and a readymade entree to scores of new markets. Another benefit: Cochran stockholders exchanged their $8.5 million worth of shares for around $15 million in Anaconda stock.

Even with the Anaconda name, the new company will be a modest contender in the aluminum field. But Mr. Cochran believes that Anaconda Aluminum can do more than compete. He thinks it can double its net worth in four to eight years by "combining the agility and snap of the small operator with the resources of a large one."

• **How To Grow**—Here's Mr. Cochran's growth formula for a small company:

1. Service is the key word. Make shipments on time. Keep a personal contact with the customer. Show him you're interested in his welfare.

2. Concentrate on better profit margin items to start. Later, you can branch out into the mass volume, lower profit items.

3. Maintain an active research and development program that is more crew cut than long hair—stress applied rather than basic research. Orville K. Schmied, research director at Louisville, says that major company R&D efforts are directed toward such areas as: Developing a better aluminum material for the industrial capacitor market and trying to lasso the strip conductor market by developing an aluminum product that can be substituted for copper magnet wire.

4. Pick the markets where your competitors are weak and establish yourself as a source of supply. For example, the company makes a household foil (Chef-Foil). The market is rather limited because the company doesn't feel it can slug it out with larger producers that have big national advertising campaigns. But a sales task force found that hospitals, restaurants, and hotels were forced to use household foil because of the lack of a commercial foil product. Result: The company makes a special foil in a variety of sizes and shapes and now controls a large share of this market.

Proof of Mr. Cochran's formula: Throughout the recession, Cochran Foil operated on a six and seven day workweek.

• **Future** — Says Mr. Cochran: "There's no question that we'll grow. We just wonder how big and how fast. We do believe our rate of growth in the next few years will be considerably above that of the industry. We're thinking of several times our present reduction capacity; more fabrication facilities; a more complete line of mill products; and a continuation of the spiral in our foil operations."

No wonder some people are saying: At Anaconda, copper may be king, but aluminum's the crown prince.

Mahon Widens Steel Line

Steel stocks of Steel Warehouse Div., R. C. Mahon Co., Detroit, have been expanded to include square and rectangular hot-rolled steel tubing. Two types are offered: Resistance and special submerged arcwelded.

WILL YOU HELP?

STEEL surveyed 918 top metalworking executives to learn what type depreciation reform they favored (Mar. 2, p. 69). The results: 40.1 per cent want the bracket system; 37.7 per cent want faster writeoffs, using the present useful life concept; 12.7 per cent want reinvestment depreciation; 1.8 per cent want higher first year credit. (At present, you can write off 20 per cent in the first year of acquisition if the property's cost doesn't exceed $10,000.)

Since a majority can't agree on what should be done, it's not surprising that Congress hasn't enacted broad depreciation reform. What's needed is an approach that most industrialists can support. To help you evaluate the four most favored, this week STEEL will explain the bracket system. The other three methods will be detailed in succeeding issues.

In April, the U. S. Chamber of Commerce plans a meeting of people interested in depreciation, hoping to drum up more support for reform.

Relief will come only if you who are sharply affected by depreciation policies will keep plugging for action.

WILL YOU HELP?

Depreciation Reform: Bracket Plan?

THE BRACKET SYSTEM is the most popular of the depreciation reform methods. But STEEL's survey indicates that only 40.1 per cent of the votes, far from a majority, were cast for it.

• **What It Is**—The method would classify assets into 10 or 15 general categories as in the Canadian system (see Page 67). Brackets of maximum and minimum useful lives would be given. You would be allowed to choose any useful life within the bracket without challenge from the Internal Revenue Service. Any taxpayer who wished to use a longer or shorter life would have the burden of proving its reasonableness to IRS.

Based on industry and Treasury statistics and studies, the bracket for machine tools would be seven to ten years. Most durable equipment would be in the five-to-ten year bracket; buildings and fixed installations would be in the 20-to-30 year group. Original cost would be the basis of computation.

• **Departure**—Of the four major reform suggestions (see above), the bracket proposal makes the sharpest departure from the U. S. method of depreciation which has been in effect since 1934. In that year came Treasury Decision 4422, which for the first time put the burden on industry to prove that the schedules of useful lives it was claiming for depreciation were actually in effect.

If a company couldn't prove its rates (and few could in those days of sketchy records), the government had a list it compiled in 1931 which was based largely on experience industry had in re-equipping during the 1920s. The list was revised in 1942 and came to be called Bulletin F. The average life allowed was (and still is) about 20 years. The effect has been to reduce depreciation allowances so that profits — and taxes on them — went up. What was intended as a revenue-boosting expedient has become a permanent fixture.

Bulletin F is based on experience in the 1930s (when industry could not re-equip because it lacked money) and the early 1940s (when it could not replace because new facilities weren't generally available under wartime restrictions.)

• **Since 1942**—Look what has happened technologically since 1942! A new revision of Bulletin F has been completed, but Treasury is holding it up. It's understood that the changes are not far-reaching and chiefly involve equipment invented or substantially modified since the last revision.

• **Bulletin F Metamorphosis?**—Advocates of the bracket system propose that Bulletin F should simply be a statement of policy. It might also define the asset classes.

• **Whose Fault?**—Joel Barlow, the Washington lawyer who is the chief architect of the bracket system, points out that government officials should not be blamed for our depreciation troubles. "Three management groups (usually, but not always, in the small and medium companies) are principally responsible for the durability and longevity of our outmoded and unrealistic tax depreciation policies."

They are the uninformed, misinformed, or shortsighted managers. "They have been overstating their income and overpaying their taxes for years," says Mr. Barlow. "There has been no purposeful overstatement of profits" by the uninformed or the misinformed, but the effect has been to build in a bias for the status quo in depreciation because overstated profits have led to higher salaries, wages, and dividends."

• **Bracket System Benefits**—Advocates of the bracket approach claim that their system will help eliminate the first two managerial groups—the uninformed or the misinformed—who have been unwittingly perpetuating the old depreciation. The bracket plan is far easier to understand than what we have now.

It will also require less Treasury policing and will lead to fewer costly disputes with revenue agents, proponents claim. Another advantage: It works. Canada has been proving the case for ten years.

Its major plus: Brackets will allow depreciable lives short enough so that the prospect for the depreciation writeoff does not stand in the way of a necessary replacement or addition.

• **Drawbacks**—A major criticism is that the system departs too sharply from the old route.

Congress would be slow to accept such radicalism.

Another disadvantage, claim some critics: It would leave some taxpayers worse off than they are now. (They are the persuasive ones who have sold IRS on relatively short lives.) Proponents counter that taxpayers could have the option to keep the system they now have. The critics' rebuttal is that such a move would introduce unwanted complexities.

Among the many backers of the bracket system are the U. S. Chamber of Commerce, the National Machine Tool Builders' Association, and the Metal Cutting Institute.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

How Canada's Plan Works

The bracket system is modeled after the Canadian plan. The chief difference: The bracket setup has upper and lower limits (hence, the name); the Canadian approach allows all property, which has been divided into 14 classes, to be written off at any pace up to the maximum rate indicated for the category. If the Canadian taxpayer wants to, he makes no claim for depreciation in one year, or he can vary the amount claimed from year to year (if he doesn't go over the maximum). One reason for putting limits at both ends in the American proposal is to discourage wide variations in writeoffs. Canada allows the declining balance method of figuring amortization. Here are some sample maximum rates used in Canada:

Item	Class	Rate
Boilers for manufacturing	8	20%
Contractors' movable equipment	10	30
Dies	12	100
Electric generating equipment (auxiliary)	9	25
Electric wiring for equipment	8	20
General machinery (not otherwise specified)	8	20
Jigs	12	100
Oil burners for manufacturing	8	20
Patterns	12	100
Radar and radio equipment	9	25
Storage tanks for oil or water	6	10
Tractors, trailers, trucks	10	30

Source: Canadian Tax Foundation.

Joel Barlow is the principal architect of the bracket system. He's a Washington lawyer with Covington & Burling, chairman of the U.S. Chamber of Commerce's tax committee, and president of the Tax Institute Inc., Princeton, N. J.

How Far Can Unemployment Go?

WATCH the unemployment rate for indications of government action on interest rates, depressed area aid, import controls, unemployment compensation, and a host of other factors which can affect your business.

Last week, Commerce and Labor Departments reported 4.7 million were unemployed during the first six weeks of 1959. That compares with 4.1 million in December. During budget briefings last December, high administration officials warned that rising unemployment figures during the first months of the new year would be regarded as serious. The latest boost in the discount rate by the Federal Reserve Board indicates more confidence in the future and greater concern that the economic rebirth may get out of hand before the year is over.

Labor Secretary James Mitchell confidently expects unemployment to drop to 3.3 million by October. Raymond Saulnier, chairman of the Council of Economic Advisers, thinks it will be "not much above 3 million" by the end of the year.

How To Keep the Economy Growing

"Reasonable" price stability remains the administration's highest goal, not reduced unemployment figures. As Mr. Saulnier puts it: Price stability is a "necessary condition" for a high rate of production and employment. Our average rate of economic growth has been 3 per cent per year; he wants it pushed to 5 per cent a year. The increase will depend upon a "more rapid rate of capital accumulation," which, in turn, depends upon "circumstances congenial to savings." A high degree of confidence in the stability of the dollar must stand back of an increased savings effort. We will have growth with stable prices, "or not at all," sums up Mr. Saulnier.

Historically, one-third of our annual rate of growth has been realized through growth of the labor force, while two-thirds has depended upon increased productivity, he says. To get us up to the "magic" growth rate of 5 per cent annually, we will need more automation to boost productivity. To get the needed equipment, there is a belief that taxes must be lowered on higher incomes to encourage savings and investments.

But "the Cupboard Is Bare . . .

The dynamic conservatism of Mr. Saulnier must be contrasted with more liberal views to appraise the fate of legislation affecting business in this Congress. Sen. Joseph Clark (D., Pa.) is a good spokesman because he comes from a state where "508,000 are walking the streets." He charges that gross national product per capita (in 1958 dollars) has increased less than $1 a year since 1952 (GNP per capita in 1952 was $2505, vs. $2509 in 1958). Senator Clark warns: "The cupboard is bare in Detroit, Wilkes-Barre, and Lawrence, Mass."

He blames the President's budget: More money is needed for national defense, housing, airports, depressed areas, atomic energy, and school construction. The administration's answer: It avoided rash expenditures for pump priming during the recession; there is no need to start now that the worst is over.

Minuteman Work for Small Firms

Good news for metalworking firms employing less than 500: Joseph Crosby, president, Thiokol Chemical Corp., reports "60 per cent of the work" received from the Air Force under a $77 million contract for Minuteman propulsion systems will be subcontracted, "with a large portion going to small business." Aerojet-General Corp. has an $85 million contract for the second and third stages of the missile.

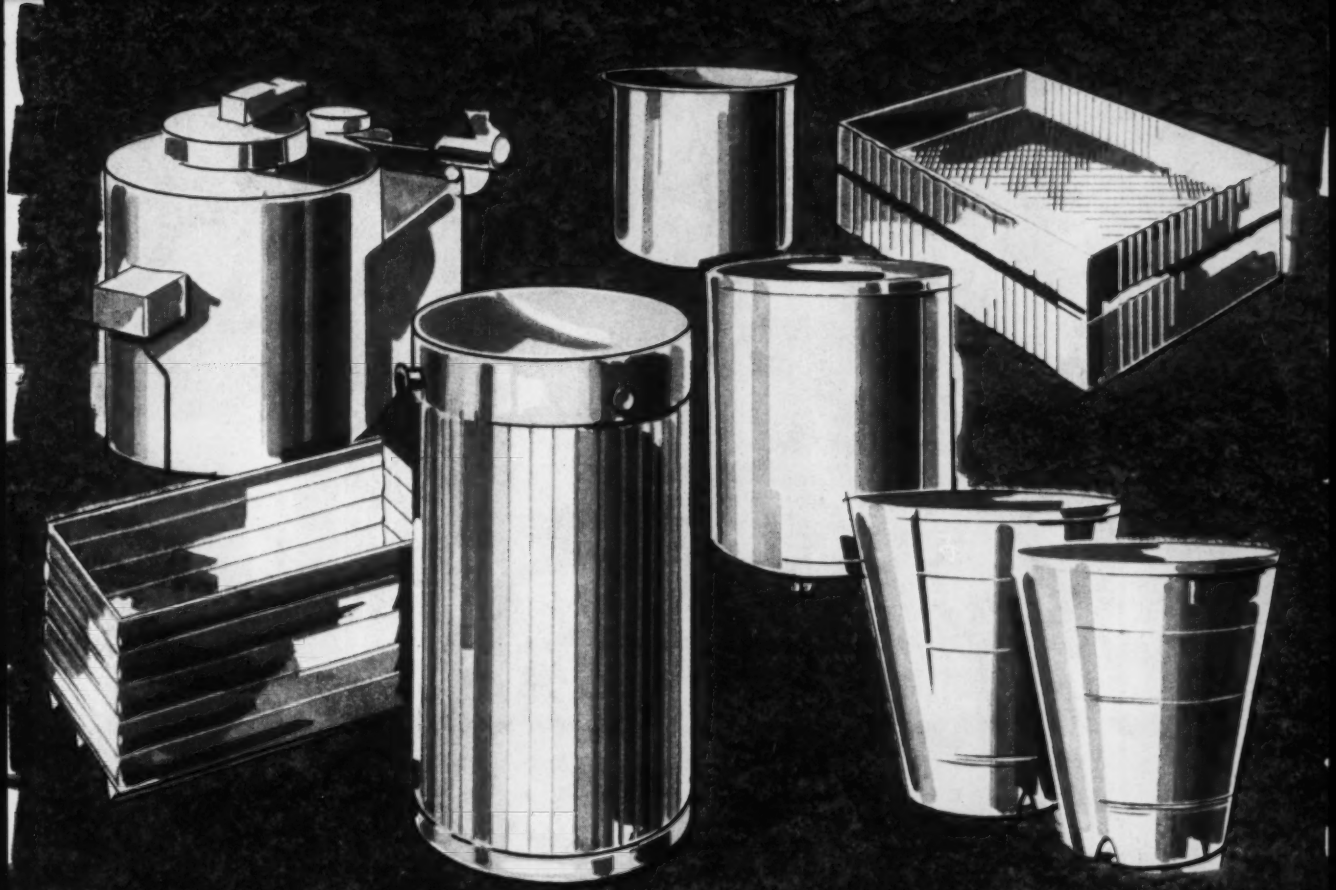
Those are the first contracts which the AF has announced in dollar figures. Other firms known to be working on the Minuteman: Boeing Airplane Co., North American Aviation Inc., Avco Mfg. Corp., and Hercules Powder Co. Advice: If you haven't made your abilities known to those prime contractors, it may soon be too late for you to get a piece of the biggest missile program of all. Eventually, billions of dollars will be involved.

Trade War Is Joined by Magnuson

Sen. Warren Magnuson (D., Wash.), chairman, Interstate & Foreign Commerce Committee, is ready to take on the Russians in competition for world markets. His committee will get $225,000 for investigations during 1958.

Special Bonds for Road Program?

Pressure is building up on Capitol Hill for the Treasury Department to issue bonds to keep the federal road program in high gear. The bonds would carry promises to pay based on future revenues available to the Highway Trust Fund. Bonds will be the only way for the program to obtain money without dipping into the Treasury's general revenues.



*For Heat Treating Equipment**

Nothing Beats **Ingersoll** Heat Resisting Stainless

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If it calls for heat resisting stainless steel, call on Ingersoll for your needs. Ingersoll heat resisting stainless is scientifically formulated to provide maximum strength and durability under high operating temperatures. And it has exceptional forming characteristics for easy fabrication into the shapes you require.

What's more, when you specify Ingersoll heat resisting stainless steel you get *customized* service. Production schedules set up to meet *your* requirements. Sheet and plate to your exact analysis, size and gauge specifications. Quality control that assures uniform high quality. On-time, as-promised deliveries to meet your own production needs.

If you use heat resisting stainless, nothing beats Ingersoll . . . or Ingersoll service. Try us, and see.

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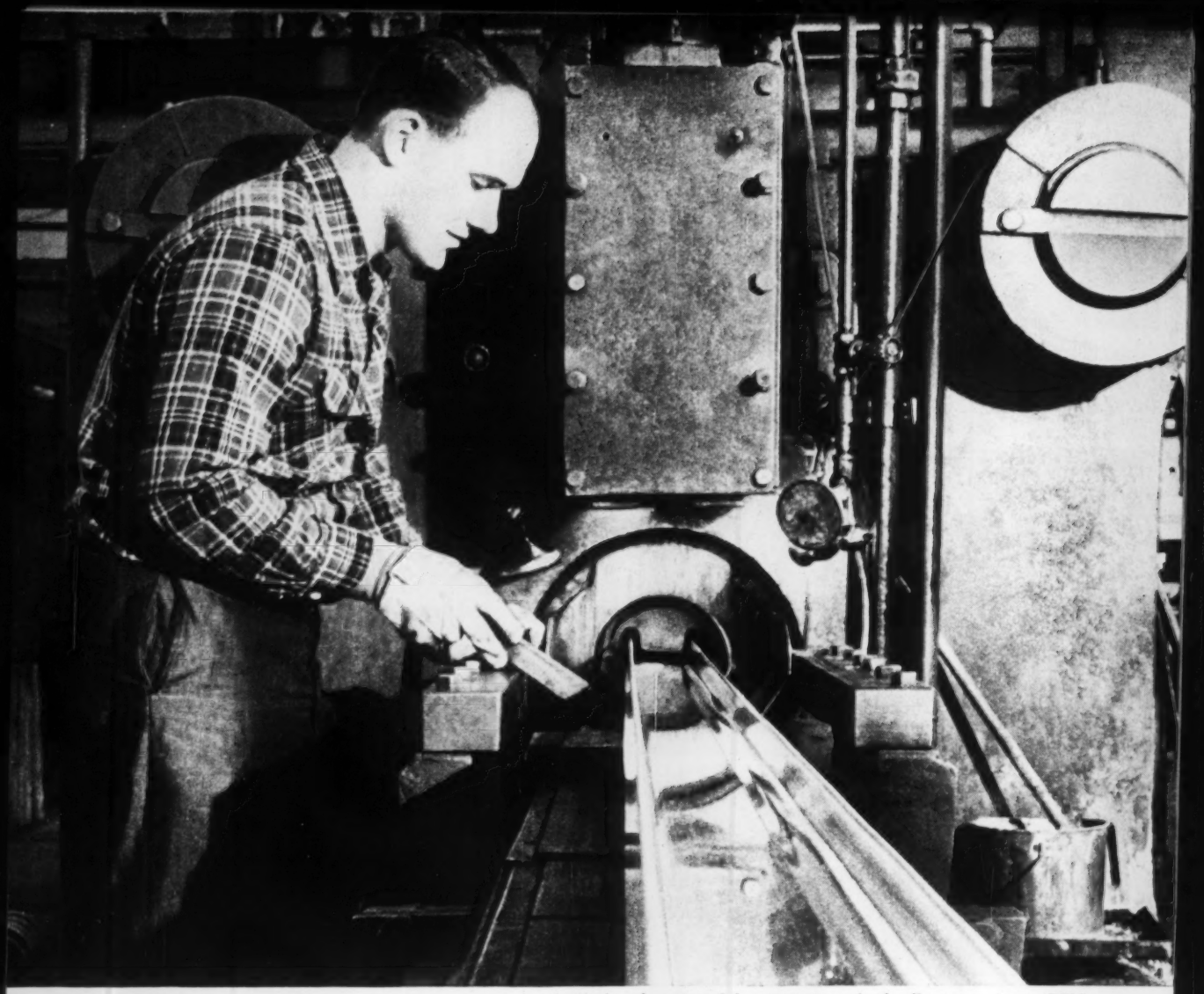
75 YEARS
1959



An improved version of the magnesium silicide alloys, new ALCAN B51S is substantially more economical to extrude than AA-6061.

From Aluminium research...

A new kind of extrusion alloy

New ALCAN B51S aluminum alloy... extrudes more economically than its alloy equivalents... offers important new market opportunities for your extruded products.

Newest of Aluminium Limited's research developments, ALCAN B51S offers many advantages to aluminum extruders now working with AA-6061 (ALCAN 65S).

The immediate advantages of this new alloy are realized in the shop—in economy of extrusion and in the quality of the as-extruded finish. For ALCAN B51S extrudes substantially faster than AA-6061 (ALCAN 65S) with less pick-up and fewer die lines. Both advantages are particularly evident in porthole extrusions.

To the independent fabricator, the new alloy also offers increased market opportunities. Its greater strength will be valuable in many areas of aluminum application: including railings, decking, lighting standards and brackets; electrical substations and structural members of road vehicles—each and every one a new mass-tonnage opportunity for the aluminum fabricator.

For technical information on new ALCAN B51S, or for specific assistance on any ingot problem, call or write the nearest office of Aluminium Limited Sales, Inc.

Aluminium Limited

Ingot Specialist...serving American Aluminum Fabricators—

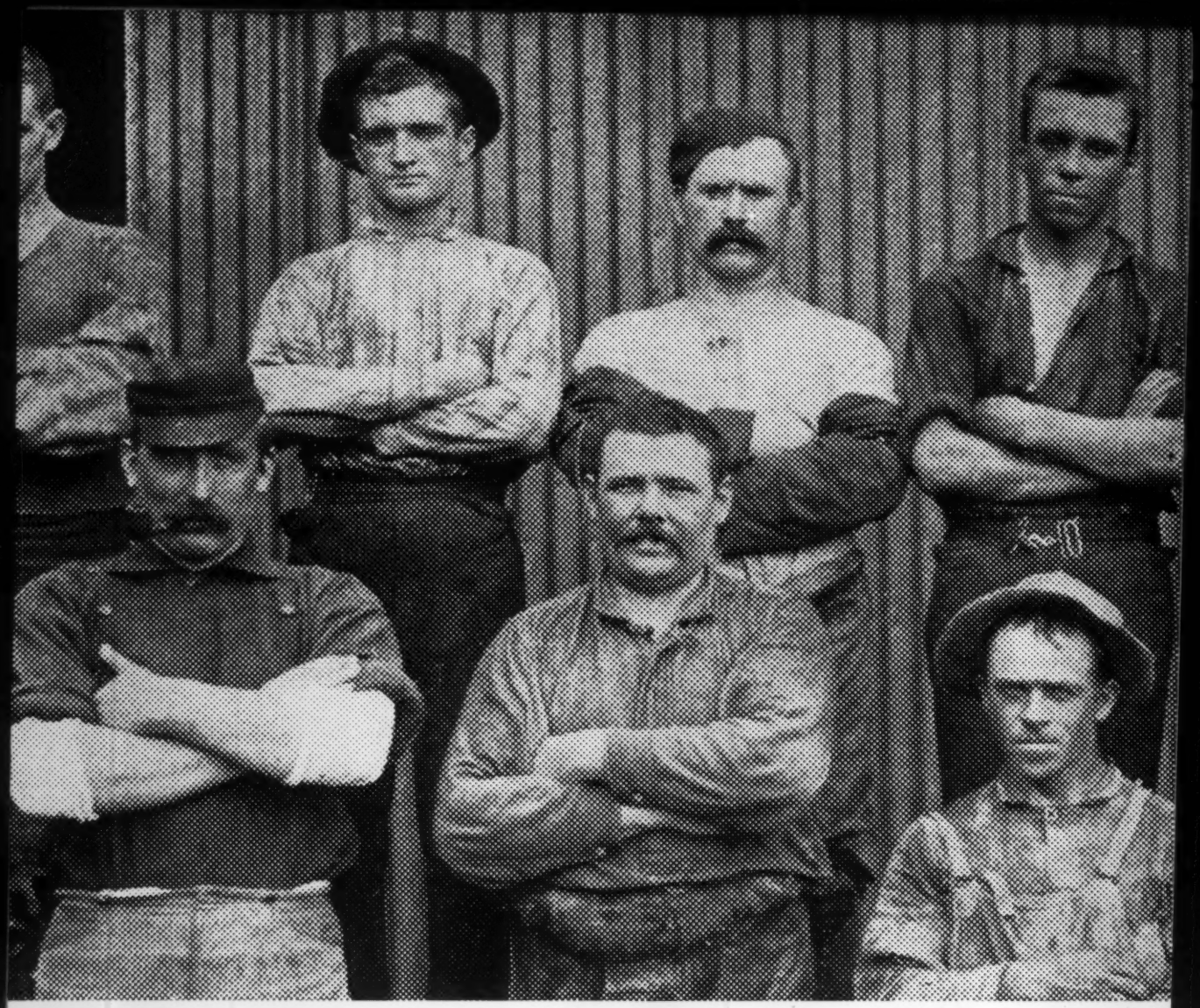
In the U.S. — Aluminium Limited Sales, Inc.
630 Fifth Avenue, New York 20, N.Y.
Cleveland • Chicago • Los Angeles • Detroit • Atlanta

Additional distribution (Alcan Foundry Alloys):
Apex Smelting Co., Chicago, Cleveland, Los Angeles
Charles Batchelder Company, Inc., Botsford, Conn.

Basic Oxygen Steelmaking Grows in World-Wide Scope

Five new shops throughout the world raised annual ingot capacity 4 million tons in 1958, bringing total L-D capacity to over 10.2 million tons. Kaiser Engineers predict capacity will top 14 million tons by 1960

COMPANY	LOCATION	NUMBER OF FURNACES	CHARGE CAPACITY (tons)	STARTUP DATE
Jones & Laughlin Steel Corp.	Aliquippa, Pa.	2	65	Nov. 1957
Kaiser Steel Corp.	Fontana, Calif.	3	65	Dec. 1958
McLouth Steel Corp.	Trenton, Mich.	3	35	Dec. 1954
		2	80	Apr. 1958
Acme Steel Co.	Riverdale, Ill.	2	50	Early 1959
Dominion Foundries & Steel Ltd.	Hamilton, Ont.	2	44	Oct. 1954
		1	66	Dec. 1956
Algoma Steel Corp. Ltd.	Sault Ste. Marie, Ont.	2	66	Nov. 1958
Vereinigte Oesterreichische Eisen-und Stahlwerke A.G.	Linz, Austria	3	33	Nov. 1952
		2	55	1959
Oesterreichisch—Alpine Montangesellschaft	Donawitz, Austria	2	33	May 1953
Gussstahlwerk Witten A.G.	Witten, West Germany	1	22	June 1957
Gusstahlwerk Bochumer Verein A.G.	Bochum, West Germany	2	39	Sept. 1957
Mannesmann Huttenwerke A.G.	Huckingen, West Germany	1	33	1959
Acieries de Pompey	Moselle, France	2	17	Dec. 1955
Siderurgia Industrial Compania Iberica S.A. (SICI)	Barcelona, Spain	1	6	1959
Altos Hornos de Vizcaya	Bilbao, Spain	2	40	1960
Siderurgia Nacional (SARL)	Lisbon, Portugal	2	33	1960/61
Societa Finanziaria Siderurgica Finsider	Rome, Italy	2	61	1960/61
National Metallurgical Research Center	Brussels, Belgium	(undetermined)		
Acieries Reunies de Burbach-Eich-Dudelange S. A. (ARBED)	Luxembourg, Belgium	(undetermined)		
Koninklijke Nederlandsche Hoogovens en Staalfabrieken N.V.	Ijmuiden, Netherlands	2	66	Jan. 1958
Osakeyhtio Vuoksenniska Akteibolag	Imatranskoski, Finland	2	17	1959
Yawata Iron & Steel Co. Ltd.	Yawata, Japan	2	55	Sept. 1957
	Tobata, Japan	2	66	Late 1959
Nippon Kokan Kabushiki Kaisha	Kawasaki, Japan	2	46	Jan. 1958
	Mizue, Japan	2	77	Early 1959
Amagasaki Steelworks Ltd.	Amagasaki, Japan	2	33	1959
Hindustani Steel Ltd.	Rourkela, India	3	44	1959/60
Companhia Siderurgica Belgo Mineira	Monlevade, Brazil	2	33	Oct. 1957
		1	33	1960/61
Companhia Siderurgica Paulista	Sao Paulo, Brazil	2	73	1960/61
USSR	Novatula	1	7	1952
USSR	Dnjepropetrovsk	3	22	Sept. 1956
USSR	Stalinsk	Unknown	75-80	Unknown
West Siberia Metal Works	Kuznetsk Basin	Unknown	Unknown	Unknown
USSR	Krivoi Rog	2	40	Unknown



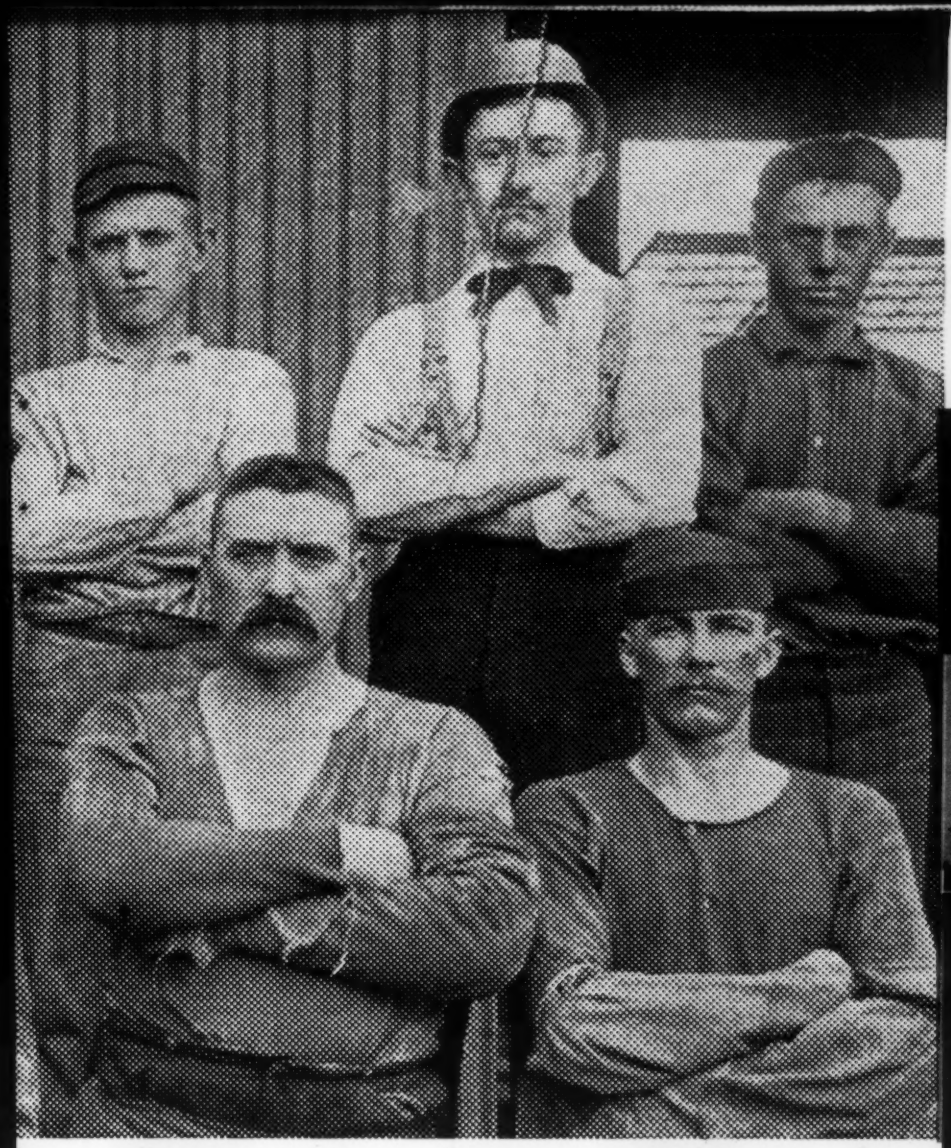
management problem

Back in 1898, Tom Corbley *(front row, left)* and his Melting Crew were a proud and imposing lot. The Spanish-American War was on. And the nation's eyes were focused on the unique little mill in Reading, Pa., that was busy turning out the world's largest production of newly-discovered, armour-piercing projectiles.

Since 1898, the spectre of Tom Corbley's crew has presented a problem to *Carpenter* management that has been almost 70 years in the solving—how to apply the skills and pride of workmanship exemplified by Corbley's men, to the formulation, the production, and then the mass-production of the world's finest specialty steels.

Today the problem is solved. But it was a gradual process. Because *Carpenter* was born a small Mill, it has been free to grow slowly—to maintain purest quality in every pound of specialty steels it released to industry. Quality . . . and only the finest quality . . . before mass-production.

Today, both are possible. With the acquisition of steelmaking facilities in Bridgeport, Conn., *ingot tonnage capacity has*



been doubled almost overnight. Additional electric arc melting furnaces, rolling mills, new annealing and heating furnaces, and other finishing equipment . . . each with *Carpenter's* unique quality controls . . . started operating in the past year.

In the years ahead, *Carpenter* will continue to grow—to keep pace with the ever-increasing demands of industry—for the world's finest specialty steels.

tool and die steels
stainless steels
electronic and magnetic alloys
special-purpose alloy steels
valve, heat-resisting and super alloy steels
tubing and pipe
fine wire specialties

Carpenter steel

The Carpenter Steel Company
Main Office and Mills, Reading, Pa.
Alloy Tube Division, Union, N. J.
Webb Wire Division, New Brunswick, N. J.
Carpenter Steel of New England, Inc., Bridgeport, Conn.

The Modern Traffic Manager . . .

Man of Many Talents

He's Purchaser
Buys transportation.

He's Administrator
Formulates transportation policy.
Runs traffic department by most economical, practical, and effective method.

He's Co-ordinator
Co-ordinates inbound material flow with production schedules, outbound shipments with production output, and warehouse distribution activity.

He's Adviser
Advises on material handling, packaging and packing, plant location, and pricing structure.

He's Public Relations Man
Represents the company before carriers, federal and state regulatory committees, and in association work.

He's Legal Authority
Knows and abides by the ICC rules and regulations.
Negotiates transportation and warehouse contracts.
Is involved in transportation damage and loss claims.

He's Personnel Manager
Directs, hires, and fires traffic personnel.

Trafficmen: Unsung Assets

WITH THE ADVENT of commercial jet planes, the traffic manager of a midwestern component manufacturer came up with figures to show that shipping to the West Coast by air express would be cheaper than by truck. Why? Direct shipment to jobbers eliminates the need for a warehouse. A tax saving is offered. And air service provides more frequent and faster service to customers.

Every day, more companies are recognizing that the traffic manager is more than a glorified shipping clerk. They are discovering that he is a vital part of the company organization. "He works co-operatively with the major departments, performing a service function for them," says Frank L. O'Neill, general traffic manager, Minnesota Mining & Mfg. Co., St. Paul. If given the authority to act and advise, he will prove his worth over and over again, enlightened management holds.

• **New Era**—We are embarking on a new era of scientific traffic management. Today's manager not only is well-educated and tops in his field, but is well-versed in the corporate picture.

An increasing number of firms are avoiding transportation cost traps by consulting their traffic managers before choosing new plant sites. A Michigan auto partmaker neglected to do so. He built a magnificent new plant only to find when it was opened that there was no freight rate structure for that point. Freight had to be paid to the next most distant point for which rates were quoted. Result: The company lost customers as its f.o.b. costs went up $1 million the first year.

• **Responsibilities**—Today's traffic manager no longer simply finds the cheapest and quickest way to ship, although this is a major facet of his job.

"Traffic is one place where costs are still controllable," says a leading steel company official. Transportation is No. 3 on the costs parade, behind labor and materials. One source says 27 cents of every sales dollar goes for transportation.

The utilized traffic manager has a host of tasks (see at left).

• **Who Is He?**—In days gone by, men picked for such posts usually came from railroad rate departments. Today, many are college trained. Some firms hire corporate minded men who then obtain traffic knowledge in night school, seminars, league educational programs and the like. They rely on subordinates for detail work.

The managers interviewed by STEEL have as many as 45 persons directly responsible to them, including rate and route specialists, tracers, and expediters.

• **Prestige Increasing**—The traffic manager is gaining prestige rapidly.

A recent survey reports that a man with the title of manager earns from $7500 with companies having gross transportation costs of $335,000 annually to as high as $25,000 for firms with gross transportation costs of $30 million. Some men titled traffic vice president earn as much as $50,000 a year.

The steel companies have led in upgrading such executives. Most of their trafficmen are on the presi-

dent's staff. That's a higher status than many possess and can be attributed to steel firms' complex problems in the movement of ore, coal, stone, and finished products.

• **Problems**—In STEEL's interviews, the transportation executives disclosed several problems:

Lack of recognition and authority —It hinders satisfactory fulfillment of responsibility. But this situation is being rapidly corrected.

Shortage of transportation equipment—A. C. Friedsam, general traffic manager, International Harvester Co., Chicago, terms this problem particularly timely. The railroads, recently hard pressed, have deferred car replacement. Unserviceable and damaged cars are at a high level. The recession also reduced the number of single-truck operators who operated through brokers. Some firms lessen these problems by what trafficmen say is the ultimate in low costs: Leasing or owning your own equipment.

Unrealistic rates—A perennial problem is convincing carriers that such rates can price them out of a particular product market.

Insufficient training of subordinates —Many feel that preparation for jobs with greater responsibility is inadequate.

Railroad passenger service—An executive suspects some roads are making travel miserable so industry won't be on their backs when they try to cut service. "This creates ill will for the entire railroad industry," he says.

• **The Future**—Even smaller firms, where it is only a part-time job, are realizing that traffic management is more than clerking. Consultants are called upon by some small firms to aid in solving problems. The practice of regularly auditing transportation costs is spreading because it keeps them in line.

An Ohio manufacturer suffered many shipment damage claims. Losses exceeded $10,000 a year. In an appraisal of the traffic operations, a consultant made new packing and packaging recommendations which solved the problem.

After this experience, the Ohio company says: "To find and solve traffic problems, you must be traffic minded. The traffic manager can do the job if given the authority and recognition."

Profile of a Traffic Manager

• LEONARD C. SCHMETZER is an example of a modern transportation executive. He's staff general traffic manager for Thompson Ramo Wooldridge Inc., Cleveland, directing movements of supplies and products in and out of 21 plants employing 25,000. He visits each plant at least once a year.

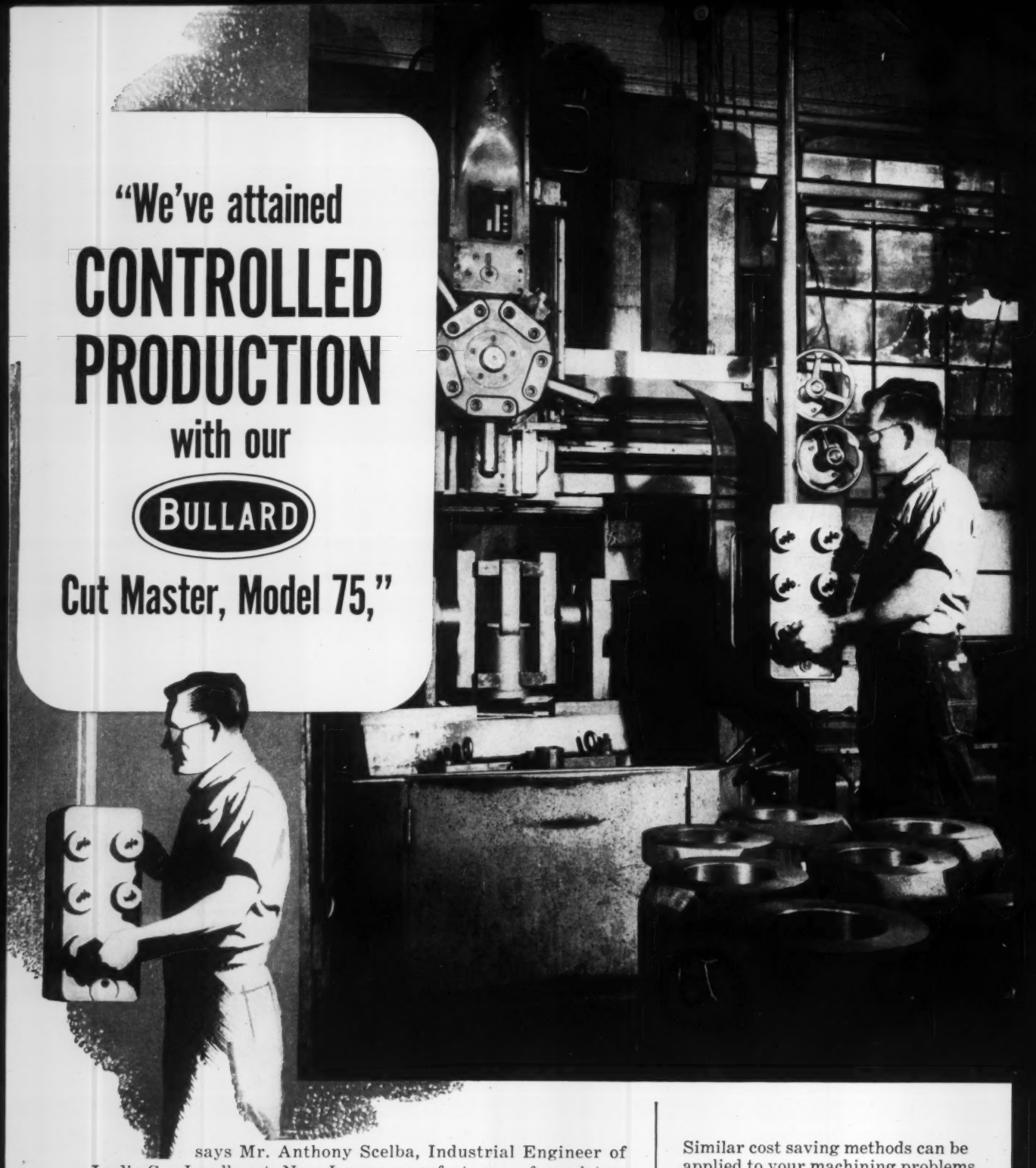
• **Background**—Mr. Schmetzer has been working in this field all his adult life. While clerking in a railroadyard, he saw the need of higher education for competent transportation management. After graduating from night school, he became assistant traffic manager for a large hardware wholesaler. In 1939, he came to Thompson as traffic manager, was promoted to general traffic manager, then to his present post.

• **Activities**—He assumes his diverse responsibilities with an awareness that his accomplishments may help his profession achieve more recognition.

Mr. Schmetzer is president of the 1200 member Traffic Club of Cleveland and is active in national and regional organizations.

• **Philosophy**—"Traffic management has come a long way in the last few years. Prior to 1946, not a single college offered a degree course in traffic. Today, there are many fine traffic departments across the land.

"There are many ways in which traffic managers can be better utilized, but it will be five more years before we reach full recognition. Through education of both the manager and his employer, there's a tremendous future in this work."



"We've attained CONTROLLED PRODUCTION with our BULLARD Cut Master, Model 75,"

says Mr. Anthony Scelba, Industrial Engineer of Leslie Co., Lyndhurst, New Jersey, manufacturers of regulators and controllers for industrial and marine steam systems.

Combining a specially designed indexing fixture, which permits indexing the piece in increments of 45° and with the automatic features of Cut Master, every piece leaving the machine is completely finished on all surfaces. This reduces the number of set-ups, for instance, on a four way valve from four set-ups to one. In this manner, production is controlled and a minimum inventory required.

Similar cost saving methods can be applied to your machining problems just call your nearest Bullard Sales Office or Distributor.

THE BULLARD COMPANY
BRIDGEPORT 9, CONNECTICUT

Model Run Production

(In thousands of units)

	1959* Nov., '58-Mar., '59	1958 Nov., '57-Mar., '58	% Change
Chevrolet	772.0	732.2	+ 5.4
Pontiac	182.3	145.1	+25.6
Oldsmobile	202.5	181.6	+10.5
Buick	178.2	166.0	+ 7.3
Cadillac	79.3	66.2	+ 7.3
Ford	671.1	560.8	+19.6
Edsel	**27.7**	**8.7**	**+118.3**
Mercury	87.3	73.0	+19.5
Lincoln	15.2	16.4	− 7.3
Plymouth	160.4	192.8	−16.8
Dodge	62.6	64.8	− 3.5
De Soto	22.8	24.6	− 3.4
Chrysler	28.6	31.5	− 9.2
Imperial	10.0	9.7	+ 3.0
Rambler	**121.8**	**68.1**	**+78.8**
Rambler American	38.7	....	....
Studebaker	**75.2†**	**18.5**	**+306.4**
Totals	2,666.7	2,360.0	+13.0

*March figures are production schedules. †Larks only.
Adapted from *Ward's Automotive Reports.*

Detroit Spots Winners

AT THE END of this month, the 1959 model run will be half over. If the second five months equal the first five, Detroit will build 5.3 million 1959 cars, vs. 4.26 million in the 1958 model run. The figure may be 200,000 higher, counting the relatively few '59s built in September and October this year and last year. Current production has settled down to where it more closely reflects sales trends. The table (left) indicates which lines are hot this year.

As expected, Ramblers and Larks are singing sweetly. Production figures only tell part of the story. S. A. Skillman, Studebaker-Packard Corp.'s sales vice president, reports his company is taking 2.8 per cent of sales, compared with 1.08 per cent a year ago. In the first five months of American Motors Corp.'s fiscal year, starting Oct. 1, sales have hit 119,036, vs. 48,050 in the previous fiscal year. Almost a third of the sales were accounted for by the Rambler American.

• **GM Strong**—Of all the General Motors lines, Pontiac is registering the greatest gains. A year ago it ranked sixth in the model production race, but if March buildups go as scheduled, Pontiac will be in fourth place, only 20,000 units behind Oldsmobile. Pontiac sales last month came to 29,673, against 19,551 in February, 1958. Oldsmobile dealers delivered 30,021 cars this February, against 25,899 last February.

Cadillac reports the biggest February in its history. It delivered 12,649 cars, 15.9 per cent over year ago sales. The division is apparently taking conquest sales from Lincoln and Chrysler. But the retail delivery rate of Imperials is 40 per cent higher than it was a year ago.

Buick is not doing as badly as some people suggest — although there doesn't seem to be much doubt that the line is not selling as well as GM hoped. Unless output is cut more, Buick will hang on to fifth place in the production run. Design problems with the Buick suspension system apparently are the biggest reason for sales difficulties. Dealers are discounting heavily, and the factory is reportedly replacing rear springs and stabilizer bars if customers turn on enough pressure.

• **Edsel Hot**—The real sleeper this year is Edsel. It went through 1958 at a dismal rate, winding up the model run with 63,110 completions. Only 26,563 were counted in the

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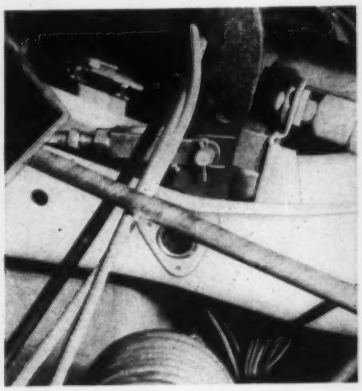
Making Chevrolet Brace Requires 18 Operations

STAMPING out 35,000 Chevrolet brace assemblies monthly is a critical job for Falls Stamping & Welding Co., Cuyahoga Falls, Ohio. Initial forming is done on a 150 ton Niagara press. It's an irregular form, ranging from 2.86 to 5 in. Next, a 125 ton press bends the ears to a 90 degree angle and twists them into correct position. Flanges are formed at the same time

CHECKING follows piercing and reaming. Some 15 gages are used to make sure the 19 holes in the finished part are properly aligned. All holes must be accurately dimensioned and lined up with the center pilot hole (to which the brake pedal is attached). Once the holes are in line, the brace is welded into position between the cowl and dash of the car



INSTALLED, the brace looks like this. It braces the steering column, fastens the instrument panel to the dashboard, and supports the brake pedal. Uniformity of thickness tolerances and absence of springback are keys to maintaining quality. The braces are made from 13 gage, hot rolled steel supplied by Jones & Laughlin Steel Corp., Pittsburgh

calendar year. Edsel's output in the first quarter of this year should total 14,400 units, over half of what it built in 1958. Dealers report Edsels are selling for about $50 more than comparable Fords, which may be one of the reasons for its success. Leo C. Beebe, Edsel's marketing manager, reports February sales are 28 per cent higher than those in February last year.

Mercury is making a better showing, too. One executive tells STEEL that customer complaints on Mercury are more than 75 per cent below the 1958 rate. Sales increased 12.4 per cent in the first two months of this year, claims J. E. Judge, Mercury's marketing manager.

Ford Div. claims it's building cars for "people," and apparently people are beginning to buy this more conservative approach. While the division still is running behind Chevrolet in cumulative sales and output, Ford officials are pleased to see that its percentage increase over last year is almost four times better than Chevy's—a factor that's far more important than winning the sales or production race.

• **Chrysler Comes Back**—March is a makeup month for Chrysler Corp. as it moves back into full production after being shut down for lack of glass. By the end of this month, the company will be only 36,000 units behind its November-March model run of last year. Plymouth had the biggest loss. Less than 9000 were built in February, compared with its previous monthly rate of 30,000. On a calendar year basis, it appears that the company will close out the first quarter slightly ahead of where it was last year. Projected schedules calls for 179,543 cars to be built in the January-March period, vs. 157,000 units in 1958's first quarter.

U. S. Auto Output

Passenger Only

	1959	1958
January	545,757	489,515
February	478,484	392,112
2 Mo. Totals	1,024,241	881,627
March		357,049
April		316,503
May		349,474
June		337,355
July		321,053
August		180,324
September		130,426
October		261,696
November		514,099
December		593,920
Total		4,243,526
Week Ended	1959	1958
Feb. 7	114,282	109,028
Feb. 14	115,491	101,656
Feb. 21	120,780	89,977
Feb. 28	127,783	91,508
Mar. 7	133,838†	83,892
Mar. 14	132,000*	86,447

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

• **The Hedge**—While model run production figures are useful to suppliers of parts, they don't insure that the industry will build or sell 5.5 million domestic cars in calendar 1959. The spring sales rush may not materialize. (It hasn't for the last two years.) A fair number of buyers seem to be waiting for the smaller economy cars due out this fall. But if traditional patterns continue, the odds are that we'll still come close to the predicted 5.5 million mark. Imports may shove 1959 sales over the 6 million level.

At General Fireproofing Company...

Material savings alone will pay for Wean coil processing lines in first year

This leading manufacturer of metal business furniture used to buy steel in various size sheets, re-square it and then stretcher-level about 80% of the sheets. Now a Wean slitting line and Wean FLYING PRESS combination shearing and blanking line (including a built-in leveler) make it possible for GF to purchase about 90% of their steel requirements in the more economical coil form. Maintaining a large sheet inventory is no longer necessary and costly re-processing operations have been eliminated entirely.

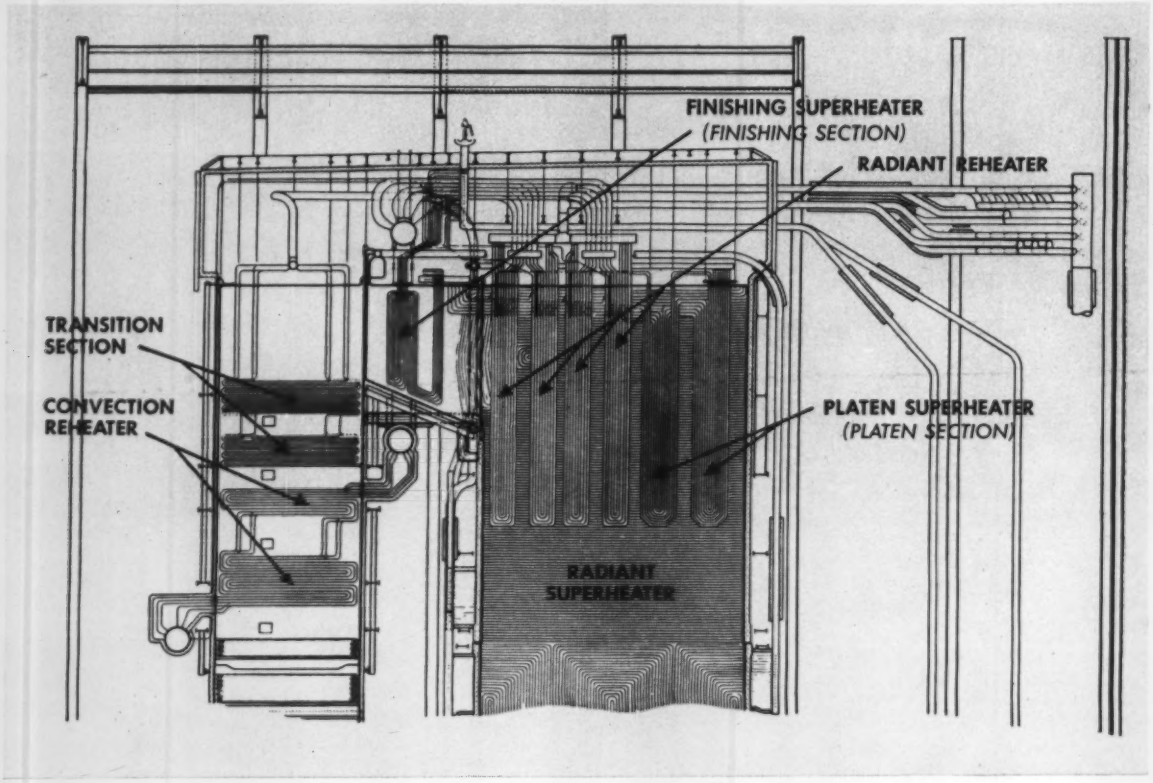
Based on figures covering the first six months these Wean coil processing lines have been in operation, GF expects material savings in the first year alone will exceed the cost of the equipment. Company officials estimate even greater savings when peak performance of the equipment is realized and when the FLYING PRESS is utilized for simultaneous shearing-blanking operations at a future date.

If you use sheet or strip steel in quantity, it's likely Wean coil processing equipment can reduce your material production costs.

We'll be happy to send you descriptive literature; or, if you prefer, one of our sales engineers will be glad to give you full information.

WEAN EQUIPMENT CORPORATION
CLEVELAND 17, OHIO
Detroit • Chicago • Newark

WEAN



Philadelphia Electric sets new record for steam pressure-temperature *using Timken® seamless steel tubes*

COMBUSTION ENGINEERING CO., had the job of designing and building a steam generator for a revolutionary new power plant for Philadelphia Electric. They had to harness the highest combination of pressure-temperature ever achieved with steam—5,000 psi and 1,200° F.

This meant superheater tubes made of a special, stronger steel never before used in steam power plants. But no one had ever succeeded in piercing this tougher steel. Combustion Engineering gave the problem to Timken Company metallurgists, experts at piercing special steels for 29 years. And they turned the trick. They made the electric furnace steel with the alloying elements in just the right balance to develop perfect piercing quality. They were able to pierce *20 miles* of tubes free from either surface or internal flaws.

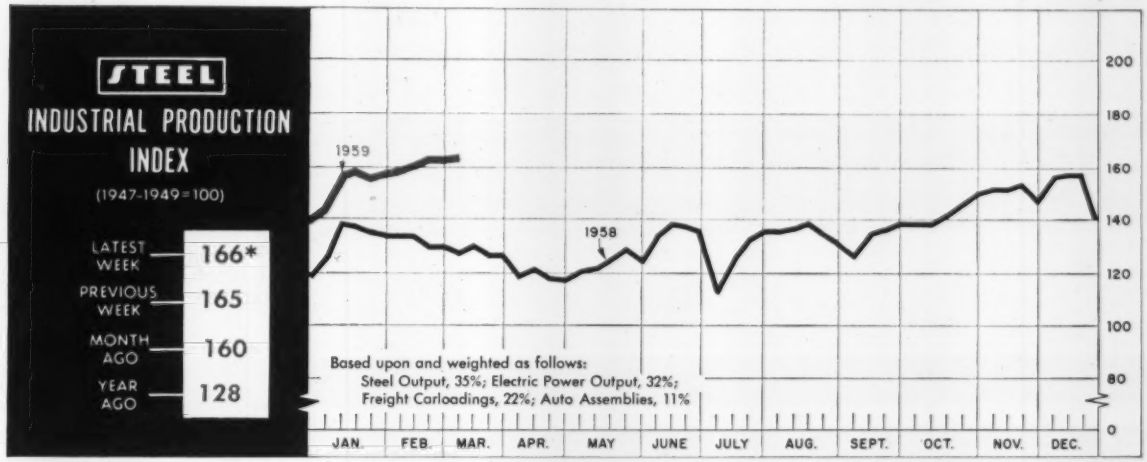
And now you can get Timken® heavy wall seamless tubes up to 11″ O.D. x 3¼″ wall. It's available in all the popular low and intermediate alloy steels and austenitic stainless grades—304, 316, 321, 347 and other special analyses. This gives designers a broad range of high temperature strength together with the required degree of corrosion and oxidation resistance. And delivery is within normal mill lead times.

Because we make our own electric furnace Timken fine alloy steel, you can be sure of accurate analysis—uniform from heat to heat, order to order, tube to tube. If you have a tubing problem, Timken Company metallurgists will gladly help you solve it. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING



*Week ended Mar. 7.

Consumer Buying Power Nears Peak

CONSUMERS are in an excellent position to keep the nation's economy on the uptrend. There are at least four good reasons:

• **Employment**—Payrolls are climbing as the recovery continues. Latest figures show employment in January was 62,706,000, a record for that month, even though nearly 5 million are unemployed. The workweek has climbed back to a normal 40 hours, and overtime is common.

• **Income**—Personal income, which remained strong right through the recession, rose to a record annual rate of $362.3 billion in the year's initial month, $13.9 billion above the corresponding 1958 period. The biggest gains were in wage and salary disbursements and dividends.

• **Credit**—Total credit outstanding ($44.4 billion) is still well below prerecession levels. Installment credit has been gaining since November, but it is only up to the year-ago rate, while automotive paper is well below the corresponding 1958 level.

• **Prices**—Over-all, prices have remained stable since mid-1958. The Consumer Price Index of the Bureau of Labor Statistics was 123.7 (1947-49=100) last June. The current reading is 123.8.

Despite the headlines about defense and other types of spending, consumers play the biggest role in determining where the economy goes. They account for about 65 per cent of the gross national product. But having the money to spend and going out to spend it are two different things. Two recent studies have cast some light on how far the consumers' spending mood will go in 1959.

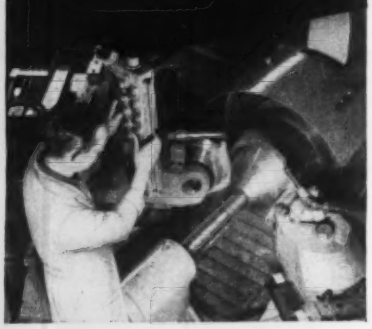
• **Optimistic but Cautious** — The 1959 survey of consumer finances by the Federal Reserve Board and the University of Michigan Survey Research Center shows clearly that

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1,000 net tons)[2]	2,600[1]	2,556	1,463
Electric Power Distributed (million kw-hr)	12,850[1]	12,972	11,793
Bituminous Coal Output (1,000 tons)	8,190[1]	8,055	8,310
Crude Oil Production (daily avg—1,000 bbl)	7,100[1]	7,199	6,328
Construction Volume (*ENR*—millions)	$523.1	$285.7	$365.1
Auto, Truck Output, U. S., Canada (*Ward's*)	166,316[1]	162,728	108,322
TRADE			
Freight Carloadings (1,000 Cars)	580[1]	576	545
Business Failures (Dun & Bradstreet)	296	310	331
Currency in Circulation (millions)[3]	$31,126	$31,111	$30,562
Dept. Store Sales (changes from year ago)[3]	+10%	+24%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$25,999	$21,245	$23,587
Federal Gross Debt (billions)	$285.1	$285.5	$275.1
Bond Volume, NYSE (millions)	$40.0	$27.1	$24.3
Stocks Sales, NYSE (thousands of shares)	21,018	16,355	10,452
Loans and Investments (billions)[4]	$93.9	$94.1	$87.4
U. S. Govt. Obligations Held (billions)[4]	$30.8	$31.2	$26.9
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	239.15
STEEL's Nonferrous Metal Price Index[6]	220.4	216.0	202.4
All Commodities[7]	119.2	119.1	119.4
Commodities Other than Farm & Foods[7]	127.6	127.5	125.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1959, 2,831,486; 1958, 2,699,173. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

let Ingersoll HYDROSPIN your parts



If the shape of your part is tubular, conical, hemispherical, or curvilinear, hydrospinning by the Ingersoll Kalamazoo Division may save you costly machining expense and time. If you want a seamless part, try hydrospinning. If you want precise wall thickness, turn to hydrospinning. Hydrospinning saves on metal, time and labor.

COMPLETE PRODUCTION FACILITIES

Ingersoll Kalamazoo Division has an experienced engineering staff, and complete hydrospinning equipment. If you have a metal forming problem where hydrospinning may be of help to you, send an outline of your problem or contact the Defense Sales Dept. of

Borg-Warner Corporation

ENGINEERING
B-W INGERSOLL KALAMAZOO DIVISION
PRODUCTION

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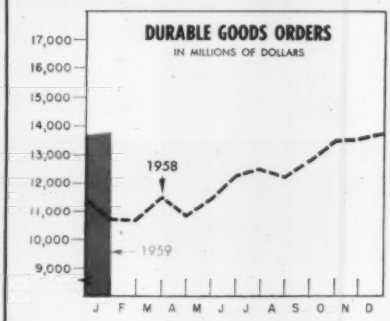
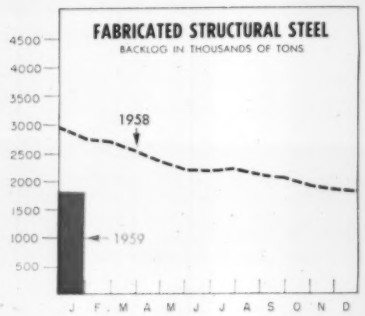
THE BUSINESS TREND





	New Orders* 1959	New Orders* 1958	Sales* 1959	Sales* 1958
Jan.	13,800†	10,704	13,700†	12 646
Feb.	.....	10,688	.....	12,038
Mar.	.....	11,488	.....	11,670
Apr.	.....	10,833	.....	11,532
May	.....	11,423	.....	11 643
June	.....	12,245	.....	12 0^6
July	.....	12,512	.....	12,256
Aug.	.....	12,177	.....	12,385
Sept.	.....	12,859	.....	12 723
Oct.	.....	13,530	.....	12,943
Nov.	.....	13,574	.....	13,295
Dec.	.....	13,700†	.....	13,600†

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1959, STEEL.

	Shipments 1959	Shipments 1958	Backlogs 1959	Backlogs 1958
Jan.	224.3	316.7	1,794	2,778
Feb.	....	282.6	....	2,727
Mar.	....	336.6	....	2,542
Apr.	....	323.6	....	2,387
May	....	328.2	....	2,211
June	....	329.2	....	2,191
July	....	290.8	....	2,220
Aug.	....	298.0	....	2,119
Sept.	....	313.7	....	2,047
Oct.	....	307.1	....	1,913
Nov.	....	271.1	....	1,839
Dec.	....	266.6	....	1,809
Total	....	3,664.2		

American Institute of Steel Construction.

consumers are more optimistic than they were in early 1958. Generally, they feel they are better off financially than they were a year ago and expect to be making more money another year hence. More than one-half the respondents think business conditions will be good in the year ahead, compared with less than one-third who thought so a year ago.

But buying plans of consumers are only moderately above those of a year ago when the recession was in full swing. Only 7.6 per cent said they plan to buy new cars. Only three times in the last 12 years has the figure been lower. About 28 per cent are in the market for furniture and appliances—down moderately from the year-ago total. But more consumers are planning to purchase homes in 1959 than in all but two of the last 12 years. And more intend to make home improvements than at any time in the survey's history, but the average cost of improvements will be lower than it has been in recent years.

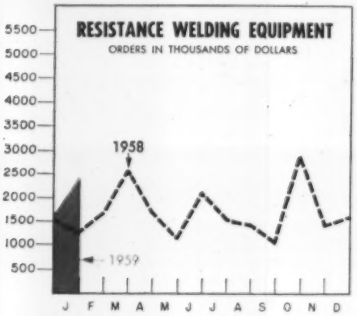
• **Paying Bills**—Another indication that the buying public hasn't completely recovered from the recession comes from the Federal Reserve Bank of Philadelphia. Officials asked 400 families: "If you received $2000 that you had not expected, how would you use it?" Only 16 per cent said they would spend it all. Another 29 per cent said they would spend part of it. But nearly a quarter said they would pay bills, and another quarter said they would save it all. The remainder would split it between bills and savings.

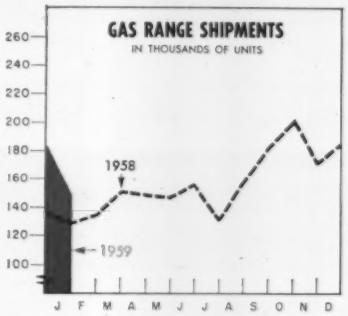
Among the 243 families who would spend all or part of the $2000, 57 said they would make home repairs. But only 15 said they would buy new cars, and only eight mentioned appliances or television sets.

Bank officials conclude: "If getting rid of current bills is the first thing that comes to mind . . . it is pretty obvious that you are not in a really good buying mood."

Steel Records Boost Index

Each week it becomes more obvious that the steel industry is the big force behind the vigorous upswing in industrial production and that something (perhaps consumer buying) will have to take its place as the prime mover after July 1. Steelmakers shattered their produc-





	Net Orders 1959	Net Orders 1958	Shipments 1959	Shipments 1958
Jan.	2,396	1,243	1,427	1,422
Feb.	....	1,683	....	1,615
Mar.	....	2,550	....	1,659
Apr.	....	1,684	....	1,963
May	....	1,121	....	1,750
June	....	2,113	....	2,346
July	....	1,534	....	2,342
Aug.	....	1,431	....	1,419
Sept.	....	1,060	....	1,125
Oct.	....	2,885	....	1,559
Nov.	....	1,409	....	1,102
Dec.	....	1,554	....	1,357
Totals	....	20,258	....	19,659

Resistance Welder Manufacturers' Assn.

	Shipment—Units 1959	1958	1957
Jan.	148,600*	128,400	149,600
Feb.	....	134,500	161,600
Mar.	....	149,400	179,400
Apr.	....	148,300	168,800
May	....	147,300	156,200
June	....	155,800	155,300
July	....	129,300	137,400
Aug.	....	157,600	182,600
Sept.	....	182,100	192,100
Oct.	....	211,900	195,500
Nov.	....	171,100	154,300
Dec.	....	184,400*	135,800
Totals	....	1,900,100*	1,968,600

*Preliminary.
Gas Appliance Mfrs. Assn.

tion record of over two years' standing during the week ended Mar. 8 by turning out 2,556,000 net tons of steel and then scheduled another record output of 2,633,000 tons last week. The steel industry, with the assistance of strikefree production in the auto industry, moved STEEL's industrial production index up 1 more point to a preliminary 166 (1947-49=100) for the week ended Mar. 7—only 2 points below the all-time high of 168.

But the 2 points might come pretty hard in view of anticipated trends in the four components.

1. Production of steel is not expected to go much higher. Orders are still flowing in at a record pace, but producers are reaching the limit of their more modern, economical facilities. They will hesitate to bring in older equipment or to add overtime work.

2. Cutbacks in the auto industry will be felt before the end of the month. Buick Div. of General Motors Corp. already has announced its second cut in operations, to be effective Mar. 24. New car inventories are reaching the point where more reductions in output can be expected.

3. Output of electric power is in a seasonal slump which won't be broken until the summer heat causes increased use of air conditioning equipment.

4. Railroad freight carloadings may improve gradually as the general economy advances, but no significant upward movement will be noticed until the iron ore shipping season starts in the spring.

If the index record is to be broken in the first quarter, it will probably come in the week ending Mar. 21, followed by a gradual decline until late in the second quarter.

Trend Fore and Aft

- New orders for durable goods industries moved up to $13.8 billion (seasonally adjusted) in January, the fifth consecutive month of uptrend. (See table and graph, Page 82.)
- Union Pacific Railroad ordered 1000 freight cars to be built in its own shops and 400 to be built by private shops.
- Gross national product for the first quarter is likely to be $463 billion (annual rate), says Guaranty Trust Co. of New York.
- New construction in February totaled $3.5 billion, a record for the month, reports the Commerce Department.

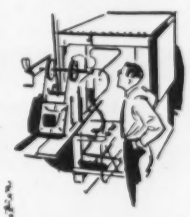
Herbert W. Westeren,
Asst. Director of Hayes Research & Development Group, Reports . . .

PRODUCTION HEAT TREATING BREAKS THE 3000°F. BARRIER

Today's "exotic" refractory metals for nuclear reactors, rocket engines, and electronic components call for heat treating temperatures of 3000°F. plus . . . temperatures heretofore limited to the laboratory.

Vacuum is often the answer. In keeping with our leadership in the vacuum field, our group developed a high temperature, high vacuum furnace for sintering, annealing, and firing operations. This versatile modification of the well-received Hayes VacuMaster® features changes in valving, power requirements, and low voltage heating elements to extend temperatures into the 4500°F plus range. Scaled for full production, Model HT/HV affords advantages of rapid cycling, saturable reactor control, cold wall construction, and vacuum to 0.1 micron.

Atmosphere furnaces are needed, too. For processing with non-oxidizing atmospheres, our group also developed the M-Y Moly Element Furnace. Uses of this 3300°F unit: reducing tungsten and silicon, ceramic metallizing, and other ultra-high temp. work. Also in design is an oxidizing and reducing atmosphere electric furnace for the 3500°F range.



These new Hayes furnaces, developed under actual production conditions in our lab, are now serving industry on high temp. jobs perhaps similar to your own. Vacuum Furnace Bulletin 5709A and M-Y Furnace Bulletin 5805 give details. Write for copies.

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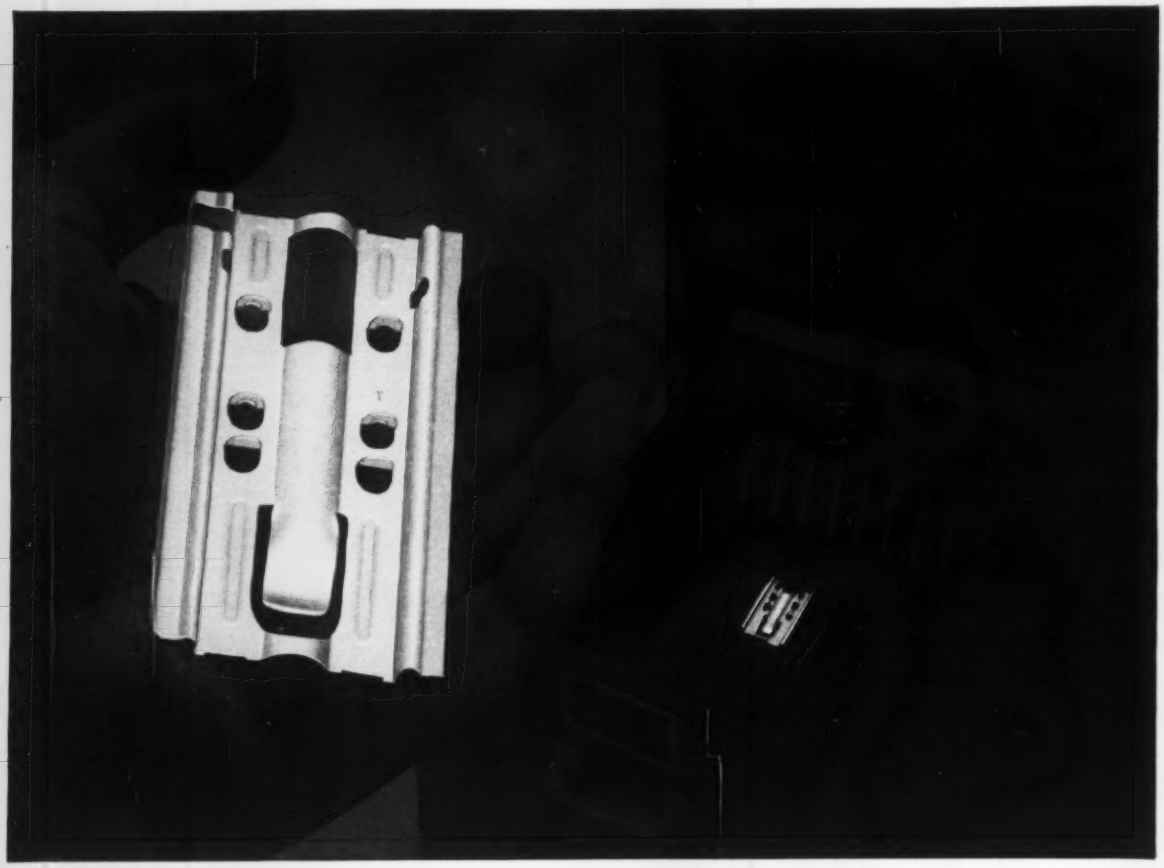
"It Pays To See Hayes" for metallurgical guidance, laboratory facilities, furnaces, atmosphere generators, gas and fluid dryers.



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Easier to assemble...easier to operate... **SPEED CLIP**® costs 50% less, too!

Assembly of the SUPER-FILER® *Divide-a-File* mechanism was considerably simplified when the General Fireproofing Company switched to a special SPEED CLIP design. Sightless people do the assembling without former difficulties of fitting spring wires into non-uniform stampings.

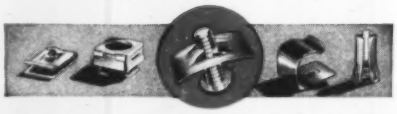
With this SPEED CLIP, the "self-adjusting" *Divide-a-File* slides more smoothly back and forth in the channel. Locking in the desired position is more positive, too.

This is another example of how Tinnerman Engineering goes far beyond the original fastening idea – how we work with customer engineering departments to produce better working units. And in the above case, a per-part cost reduction of 50% was achieved. In only 4 months, General Fireproofing had saved enough through lower assembly and parts costs to write-off new tooling needed to produce the SPEED CLIP.

You, too, can achieve savings and improvements like these on your assemblies. Invite your local Tinnerman sales representative in for a discussion of the SPEED NUT methods of better fastening at lower cost. He's listed in most Yellow Pages, under "Fasteners". Or write to:

TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®



FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

EDMUND S. MURRAH
Morgan's Rolling Mill eng. dir.

ROBERT E. PARRETT
American Hardware v. p.

RICHARD H. CARTER
Fostoria Pressed Steel pres.

PAUL J. REEVES
Timken sales v. p.

Edmund S. Murrah was named director of engineering, Rolling Mill Div., **Morgan Construction Co.**, Worcester, Mass. **Roger Kinnicutt Jr.** and **William J. Hill** will serve under Mr. Murrah as assistant chief engineers. **John H. Hitchcock**, former chief mechanical engineer, Rolling Mill Div., was appointed chief consulting engineer for all company divisions. **Bernard L. Burns** was made manager of a newly formed Design & Development Dept. These appointments were made under the direction of **Myles Morgan**, first vice president, who heads activities of the Rolling Mill Div.

Harold Ulmer, former president of **Vacuum Tube Products Co. Inc.**, Oceanside, Calif., was appointed assistant to Raymond B. Parkhurst, **Hughes Aircraft Co.** vice president and manager, Hughes Products Group, Los Angeles. Assets of the Oceanside firm were purchased in January by Hughes. **James Sutherland**, former vice president-treasurer, Vacuum Tube Products, remains in Oceanside as manager of the newly designated division.

Albert W. Kreutzberger was made chief designer, **Milwaukee Die Casting Co.**, Milwaukee.

G. W. Gould was appointed general superintendent, **Midwest Steel Corp.**, a new plant to be constructed by National Steel Corp. in northwestern Indiana in the Chicago metropolitan area. Mr. Gould was assistant general superintendent, Weirton Steel Co., division of National Steel.

Robert E. Parrett was elected vice president and director of manufacturing of all U. S. and Canadian plants of **American Hardware Corp.**, New Britain, Conn. He was plant manager of **Kwikset Locks Inc.**, Anaheim, Calif., subsidiary, and vice president of its sales subsidiary, Kwikset Sales & Service Co. **Joseph E. Madigan** was made Kwikset plant manager to succeed Mr. Parrett.

Harry M. Francis was appointed executive vice president, **American Steel & Wire Div.**, Cleveland, U. S. Steel Corp. He was vice president of sales for the division.

Richard H. Carter was elected president of **Fostoria Pressed Steel Corp.**, Fostoria, Ohio, to succeed **E. L. Bates**, resigned. Mr. Carter was named vice president in 1953 and general manager in 1958.

Ralph L. Bayless was made director of engineering, **Convair Div.**, General Dynamics Corp., San Diego, Calif. He was chief engineer, San Diego Div., and is replaced by **William W. Fox.**

Robert D. Everett was appointed general superintendent of the Sharon, Pa., Works, **National Malleable & Steel Castings Co. Louis Englebaugh** was made general superintendent, Melrose Park, Ill., Works.

Metals & Controls Corp., Attleboro, Mass., elected **Edward O. Vetter** executive vice president. He was with Texas Instruments Inc. as assistant vice president in charge of the Houston based Industrial Instrumentation Div.

Paul J. Reeves succeeds **W. B. Moore** (retired) as vice president-sales, **Timken Roller Bearing Co.**, Canton, Ohio. Former director of sales, he is succeeded by **Robert G. Wingerter.** Other Sales Div. appointments: **S. T. Salvage**, general manager-Automotive Div.; **Norman H. Peterson**, advertising manager; **W. Roderic Covey**, assistant advertising manager.

Jack Slean succeeds **Rudolph Heidrich** (retired) as president of **Heidrich Tool & Die Corp.**, Detroit. He continues as general manager. **Julius A. Schensky**, general plant superintendent, was made vice president-manufacturing. **Harold O. Love** was made vice president and general counsel; **Perry G. Abott**, secretary-treasurer. Mr. Slean is also executive vice president of Heidrich Mfg. Co. and Alloy Metal Wool Products Corp.

W. R. Ramsay was elected vice president - administration, **North American Refractories Co.**, Cleveland. He was assistant to the president, E. W. Valensi. **H. E. Stuhler**, former president and chairman, retired Mar. 1.

Superior Steel Div., Carnegie, Pa., Copperweld Steel Co., named **Luther F. Taylor** manager of sales development; **Samuel H. Cole**, manager-stainless steel sales.

Rolf V. Wallin was appointed vice president-engineering, **Union Carbide Chemicals Co.**, division of Union Carbide Corp., New York.

Horace F. Richter Jr. fills the new

SWAN E. BERGSTROM

ROBERT C. BEVIS

Cincinnati Milling & Grinding Machines executives

RALPH W. SKERRATT JR.

JOHN C. LOPATTA

executives of Falcon Foundry

post of sales co-ordinator, **Fischer & Porter Co.**, Hatboro, Pa.

Swan E. Bergstrom was elected president, and **Robert C. Bevis**, a vice president, **Cincinnati Milling & Grinding Machines Inc.**, sales subsidiary of Cincinnati Milling Machine Co. Mr. Bergstrom, who succeeds **F. V. Geier**, retired, is president of the parent firm. Mr. Bevis is sales manager, sales subsidiary.

Dr. Walter H. Zinn was elected a vice president, **Combustion Engineering Co.**, New York, in charge of nuclear power activities. He is president of General Nuclear Engineering Corp., recently acquired by Combustion Engineering.

Mallory-Sharon Metals Corp., Niles, Ohio, named **James M. Hughes** general manager-titanium sales. He was assistant general sales manager, Republic Rubber Div., Lee Rubber & Tire Corp.

Arthur H. Van Wormer was made sales manager, Industrial Products Dept., Machinery Hydraulics Div., **Vickers Inc.**, Detroit.

Warren G. Cudlip was made manager of quantity sales at **Cutler-Hammer Inc.**, Milwaukee. He was manager of the Grand Rapids, Mich., branch sales office.

Tice B. Woodcock was made purchasing agent of **Okonite Co.**, Passaic, N. J.

William K. Smith was named assistant manager of systems and procedures at **National Steel Corp.**, Pittsburgh. He was supervisor-systems and procedures at the Steel Div. of Ford Motor Co.

Ralph W. Skerratt Jr. was named president and general manager, **Falcon Foundry Co.**, Lowellville, Ohio, succeeding the late **L. M. Nesselbush. John C. Lopatta** was named vice president. Mr. Skerratt was executive vice president. Mr. Lopatta was operating vice president.

Thomas G. Barnes, former vice president-sales, assumes duties of vice president-general manager, Carbide Div., **Firth Sterling Inc.**, Pittsburgh. The company separated its steel and carbide operations into two separate divisions. Mr. Barnes will direct both sales and production of the Carbide Div. **R. K. Hopkins** was elected a vice president. Continuing direction of the Hopkins process (recently purchased from M. W. Kellogg Co. and formerly known as the Kellogg process), Mr. Hopkins will also serve as chairman of the research committee of the Steel Div. **John S. Roller**, former manager of marketing, was elected vice president-steel sales.

Wesley E. Niemond was appointed head of the Tape Center, Los Angeles, at the Electronic Control Systems facility of **Stromberg-Carlson Div.**, General Dynamics Corp.

Thomas Trowbridge was named general sales manager, Coated Abrasive Div., **Behr-Manning Co.**, Troy, N. Y., a division of Norton Co. **Thomas G. Gilcoyne** was made field sales manager of the division.

Jack Bradley was made an assistant sales manager, Industrial Div., **Lincoln Engineering Co.**, St. Louis.

Earl B. Boub was made director of purchases, St. Louis Div., **Curtis Mfg. Co.** He succeeds the late **Timothy Levene.** Mr. Boub was director of purchases, Star Mfg. Co.

John Brookshire was made planning superintendent at the Milwaukee body plant of **American Motors Corp.** He succeeds **Val Jacobi.**

H. L. Bialock was made general sales manager, **Phoenix Steel Tube Div.**, Phoenix Steel Corp., Phoenixville, Pa., subsidiary of Barium Steel Corp. **R. C. Whittington**, former superintendent, seamless tube mill, was made assistant sales manager.

J. Carlton Ward Jr., president of **Vitro Corp. of America**, was elected chairman of **Heavy Minerals Co.**, Chattanooga, Tenn. He replaces **Neele E. Stearns**, president of Crane Co., Chicago. The change follows acquisition by Vitro of the Crane Co. equity interest in Heavy Minerals. New officers of Heavy Minerals include **William B. Hall**, president; **Frank B. Jewett Jr.**, executive vice president.

James Mitchell was made district sales manager-Colorado area, **Harbison-Walker Refractories Co.** He has headquarters at Canon City, Colo.

Lester M. Markel was elected vice president-purchasing, **Markel Electric Products Inc.**, Buffalo.

Calvin A. King was elected president, **Bird Machine Co.**, South Walpole, Mass. He succeeds **F. K. Becker**, who will serve in a consulting capacity in addition to his duties as president of Bird-Johnson Co.

Robert DeDobbelaere was made product sales manager-carbide tools

IN PRODUCT AFTER PRODUCT AFTER PRODUCT . . . WEIRTON HOT- AND COLD-ROLLED SHEET

In automobiles and portable TV cabinets, in air conditioners, stoves and laundry equipment—in almost any application you can name you'll find Weirton hot- and cold-rolled sheets at work.

Their roles: helping one manufacturer after another to produce standout products at low cost with no hitches in fabrication.

You can put to good use the uniform gauge, strength and ductility of Weirton hot- or cold-rolled sheet.

Weirton is always ready to serve your needs for quality sheets. For prompt and complete service just phone or write Weirton Steel Company, Dept. B-3, Weirton, West Virginia.

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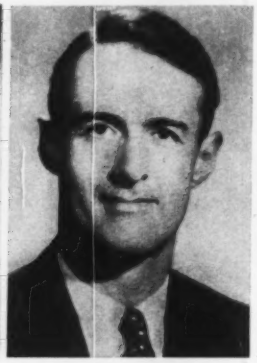
C. W. TRAUTMAN
Nankervis manufacturing mgr.

SAMUEL A. OTT
CF&I v. p.-eastern div.

ROBERT C. HILLS
Freeport Nickel president



ROBERT W. PRESSING
Linde new products post

for the Abrasives Div., **Elgin National Watch Co.**, Elgin, Ill.

Samuel A. Ott was elected vice president-operations, Eastern Div., **Colorado Fuel & Iron Corp.**, New York. He was works manager, Claymont Div., a post he has held since joining CF&I in 1956. He was previously superintendent of Midvale Co.

John D. Saussaman was made assistant general superintendent, Iron & Steel Div., at **Kaiser Steel Corp.**'s Fontana, Calif., plant. Former division superintendent, he succeeds **Clarence R. Lohrey**, named consultant to handle special products in the division. **Reynold C. MacDonald** was made assistant general superintendent, primary and pipe mills, Fontana plant. He was division superintendent, rolling mills.

Fritz C. Hyde Jr. was named assistant general sales manager, **Revere Copper & Brass Inc.**, New York. He is succeeded as manager, New York district sales, by **Harold F. Relyea.**

Robert C. Hills was elected president, **Freeport Nickel Co.**, New York. He is an executive vice president of the parent firm, Freeport Sulphur Co. **Charles J. Brown** was elected vice president-sales, Freeport Nickel.

Robert W. Pressing was made general manager, New Products Dept., **Linde Co.**, division of Union Carbide Corp., New York. He was manager of molecular sieves production and development at Linde Co., Tonawanda, N. Y.

General Electro Mechanical Corp., Buffalo (formerly General Riveters Inc.) appointed **Edward B. Butler** sales manager.

Charles L. Fiegel was named eastern sales manager, **Acme Electric Co.**, at Cuba, N. Y.

Bucyrus-Erie Co., South Milwaukee, Wis., named **Paul J. Thiel** sales administration supervisor; **Byron A. Haney**, product development manager; **Frederick B. Shew**, sales development manager.

Richard J. Seltzer was elected a vice president of **Gabriel Co.**, Cleveland. Among new responsibilities, he serves as executive vice president of **Talco Engineering Co.**, Mesa, Ariz., recently purchased subsidiary.

Frank J. Hogg was elected vice president-engineering, **David W. Murray Co.**, Cleveland. He was chief engineer.

C. W. Trautman was made manufacturing manager, **George L. Nankervis Co.**, Detroit. He was manager of test equipment engineering for Bendix Products Div., South Bend, Ind.

John A. Maxwell Jr., vice president for contracts, sales, and programming, **Temco Aircraft Corp.**, Dallas, transfers to Los Angeles to handle production operations for the subsidiary, **Fenske, Fedrick & Miller Inc.** He remains a Temco vice president, and becomes a vice president-general manager for FF&M, an electronics firm.

C. B. Peck Jr. and **John L. Tindale** were appointed commercial vice presidents, **Anaconda Wire & Cable Co.**, subsidiary of The Anaconda Co., New York.

OBITUARIES...

William C. Stumpf Jr., 50, vice president and treasurer, **Jessop Steel Co.**, Washington, Pa., and **Green River Steel Corp.**, Owensboro, Ky., died Mar. 3.

Brig. Gen. William E. Chickering (USA, ret.), 64, divisional vice president and director of administration, international group, **American Machine & Foundry Co.**, New York, died Mar. 2.

Robert G. Patterson, 67, assistant to the president, **Lamson & Sessions Co.**, Cleveland, died Feb. 6.

James S. Knowlson, 75, chairman, **Stewart - Warner Corp.**, Chicago, died Mar. 6.

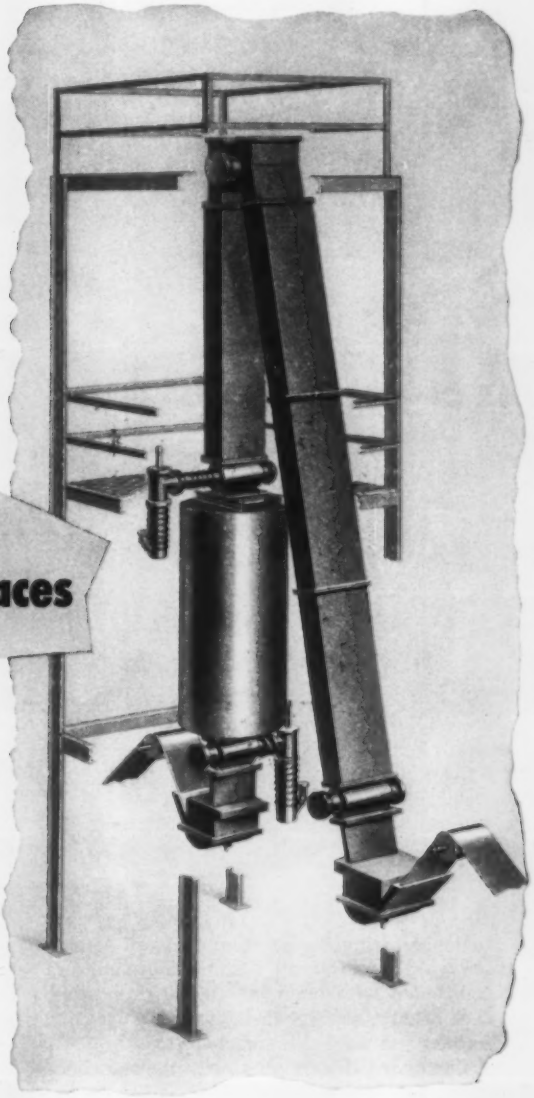
G. E. Bowdoin, 61, assistant to the president, **Worthington Corp.**, Harrison, N. J., died Mar. 4.

Richard E. Hayden, 51, sales manager, Fuel Fired Furnace Div., **Hevi-Duty Electric Co.**, Milwaukee, died Mar. 5.

Another

EF "*first*"

Fuel-fired or electrically heated Continuous Vacuum Furnaces



for bright heat treating of

Beryllium, Hafnium, Tantalum, Titanium, Zirconium, High Carbon Steels, 200—300—400 and Precipitation Hardening Stainless Steels

and other strip

Again Electric Furnace Co. research scores an important break-through in heat processing. Now, fully developed and ready for commercial service, these new EF continuous vacuum furnaces offer many advantages. This continuous vacuum treatment:—

1) Is chemically neutral to all metallic alloys. It avoids the possibility of gas pick-up by the material being treated, thus assuring no carburizing, no nitriding and no de-carburizing.

2) Improves the physical properties by "outgassing" the material.

3) Eliminates any hazard of explosion.

4) Drastically reduces the operating costs by eliminating the need for special atmosphere equipment.

Temperatures to 2100° F., higher if necessary. Strip can vary from .0005″ to any coilable thickness, in any desired width. Furnished complete with vacuum pumps, automatic controls and terminal equipment if desired.

We will welcome an opportunity to discuss with you the advantages of this new, continuous vacuum process, and to quote on the equipment that will best meet your particular requirement.

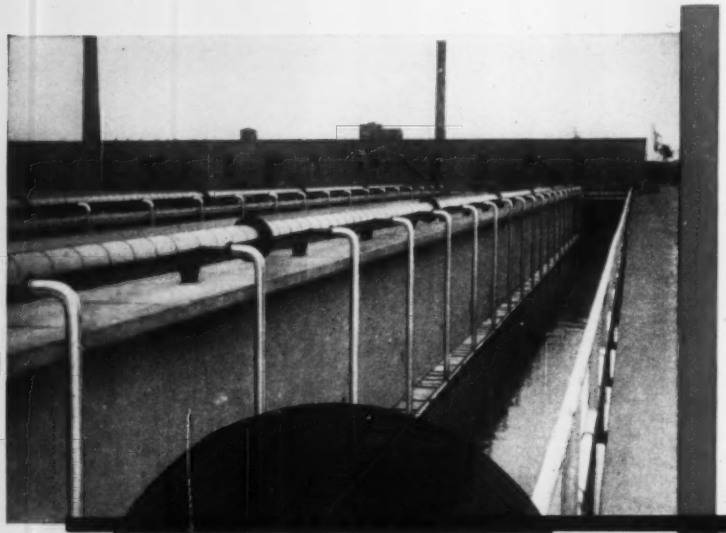
EF

THE ELECTRIC FURNACE CO.

Gas-fired, Oil-fired and Electric Furnaces for Heat Treating any Product, Using any Process, any Hourly Output.

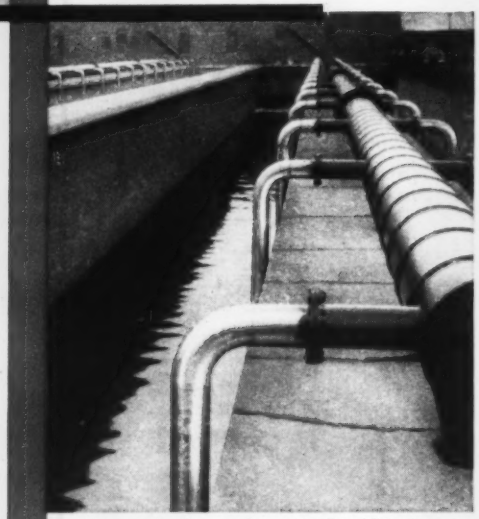
500 West Wilson Street *Salem - Ohio*

Branch Offices in Detroit, Mich., Santa Ana, Calif., and Cheshire, Conn. Canadian Associates, Canefco Limited, Toronto 13, Ontario



A CASE Where the Best Costs Less!

How a Suggestion from THE HOUSE OF STAINLESS Helped the Milwaukee Sewerage Commission Get a Better Installation at a Saving



Photos, courtesy Sewerage Commission, City of Milwaukee, Wisconsin, and E. D. Wesley Co., piping contractors.

In modernizing the aeration tanks of Milwaukee's sewage disposal plant, Commission engineers were confronted with replacing the 42 drop headers in each of 20 tanks. Previously, the headers had been formed and welded in short sections.

Discussing this program with the engineers, CSS representatives suggested that it would be more practical and economical to produce the headers from one continuous section of stainless steel tubing and smooth-flow elbows. This procedure would reduce the number of welded joints and effect substantial savings in fabrication and assembly—results that have proved out in the completed work.

While this experience involves stainless tubular products, it demonstrates the type of help you can expect from Chicago Steel Service on any stainless product—sheets, plates, bars, and other items. This counseling service goes hand in hand with prompt delivery from our complete warehouse stocks or direct mill shipments through our mill placement department.

The House of Stainless CSSCO AT YOUR SERVICE JILLL

Please phone LAfayette 3-7210

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Milwaukee District Office: 757 N. Broadway, Milwaukee 2, Wisc. Telephone: BRoadway 3-7874
Sales Representatives at Bloomington and Rockford, Illinois • Indianapolis and South Bend, Indiana
Davenport, Iowa • Grand Rapids, Michigan • Minneapolis, Minnesota • Appleton, Wisconsin

YOUR DEPENDABLE SOURCE FOR BOTH CARBON AND STAINLESS STEEL

J&L Markets Carbon Electrical Steels

JONES & LAUGHLIN Steel Corp., Pittsburgh, has entered the electrical steel field. The firm is marketing a new series of carbon electrical steels made in its basic oxygen furnaces.

The steel is stamped into laminations which become rotors and stators of motors used in a variety of appliances.

The move gives J&L another tie to the $20 billion a year electrical manufacturing industry. It also marks the corporation's further invasion of specialty steel markets.

Three grades of nonsilicon bearing, motor grade sheets are offered.

CEC Division Renamed

Systems Div., Consolidated Electrodynamics Corp., Monrovia, Calif., is now known as Consolidated Systems Corp., a wholly owned subsidiary of CEC. Phillips S. Fogg is chairman, and Kenneth W. Patrick is president.

N. H. Persons Co. Formed

N. H. Persons Co., Chesterfield, Mo., has been formed to handle sales of basic industry commodities, specializing in pig iron, iron ore, and alloys. N. H. Persons heads the firm.

U. S. Steel Buys Land

United States Steel Supply Div., Chicago, U. S. Steel Corp., has purchased land for steel warehouses at Memphis, Tenn., and in Texas (between Dallas and Ft. Worth). Construction is scheduled to start immediately.

Bliss Has New Division

E. W. Bliss Co., Canton, Ohio, has a new sales organization to handle special products and government contracts. It is headed by Robert E. Reilly.

Topp Forms Subsidiary

U. S. Science Corp., Los Angeles, has been formed by Topp Industries Inc. The wholly owned subsidiary will acquire operations of Topp Mfg. Co., a division of Topp Industries. The company produces airborne industrial and control equipment, aircraft control equipment, and other electronic products.

New Name for Penn-Texas?

Penn-Texas Corp., New York, has revealed that stockholders will be asked to change the company's name to Fairbanks Whitney Corp. at the annual meeting in May. The firm's main subsidiaries are Fairbanks Morse & Co., Chicago, and Pratt & Whitney Co. Inc., Hartford, Conn.

Elion Instruments Formed

Elion Instruments Inc., Bristol, Pa., has been organized to research, develop, and produce ultrasonic transducers, electron spin resonance equipment, and x-ray microanalyzers. H. A. Elion is president.

J&L Adds 59 Coke Ovens

A battery of 59 byproduct coke ovens (rated monthly capacity: 30,000 tons) will be built at Jones & Laughlin Steel Corp.'s Pittsburgh Works. It is the second battery planned by J&L in recent months. Costing $6 million, it will enlarge the works's byproduct department to 437 ovens and provide a monthly capacity of 143,000 tons.

S-P, Divco Talk Merger

Studebaker-Packard Corp., South Bend, Ind., and Divco-Wayne Corp., Detroit, are discussing possible merger. Divco-Wayne makes delivery trucks, school buses, and electronic products. The Detroit firm reported a $195,000 profit for the first quarter ended Jan. 31. S-P expects to make $20 million this year, considering a tax loss, carry forward credit.

Armco Adds Five Furnaces

Armco Steel Corp. will start a $775,000 expansion program at its Baltimore stainless steel facilities. Two double ingot heating furnaces and three new heat treating furnaces are to be installed. They will be in operation in about six months.

Saramar Boosts Output

Saramar Aluminum Co., Youngstown, will boost its extrusion output 35 to 40 per cent. The firm has begun a $300,000 expansion program, which includes installation of a third 1500 ton extrusion press. Extrusion capacity will be 15 million lb per year.

Tube Turns Makes Joints

Tube Turns Div., Chemetron Corp., Chicago, will enter the field of flexible piping components with a complete line of bellows expansion joints. Initial production will be in 3 to 30 in. nominal pipe sizes for applications up to 275 psi and 750° F.

TRW Lab Changes Name

Denver Laboratories is the new name of Electronic Instrumentation Co., the Denver engineering facilities of Ramo-Wooldridge Div., Thompson Ramo Wooldridge Inc., Los Angeles.

Fluor Sells Paola Plant

Fluor Products Co., a division of Fluor Corp. Ltd., Los Angeles, has sold its Paola, Kans., metal manufacturing facilities to Taylor Forge & Pipe Works Inc., Chicago.

Taylor Forge took over operation of the plant March 1. Fluor will retain its Paola construction equipment yard.

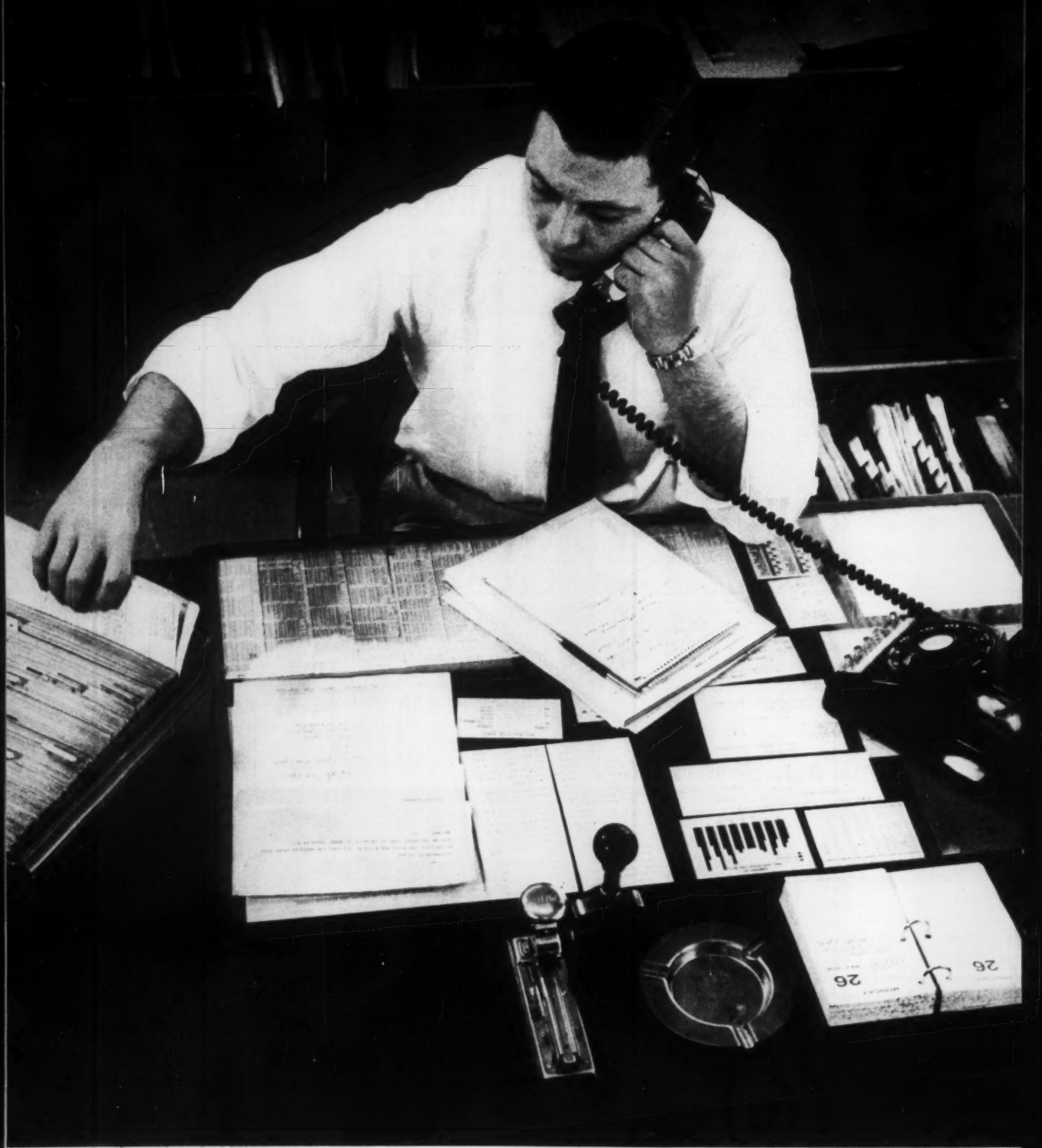
NEW OFFICES

Richmond Plumbing Fixtures Div., Rheem Mfg. Co., Chicago, opened a district office at 370 Lexington Ave., New York, under the supervision of J. J. Hanrahan. T. C. Gillen is New York district sales manager.

Machine Screw Dept., **Harvey Hubbell Inc.**, Bridgeport, Conn.,

(*Please turn to Page* 94)

integrated CRUCIBLE steel service



Ask the Crucible inside account salesman for a run-down on all the services his warehouse offers. He's your contact with completely integrated services ranging from local delivery of the steels you need to metal research.

makes available a local

4-POINT SPECIALTY STEEL SERVICE

to both large and small users

All 31 warehouses offer
(1) simplified ordering
(2) in-stock deliveries
(3) metalworking assistance
(4) metal research

Each Crucible warehouse is a *specialty steel service center* – stocked, staffed and equipped to give you a wide range of services.

Here's what the warehouse near you can offer –

(1) *Simplified Ordering.* The inside account salesman assigned to you expedites all your orders, arranges for extra services and speeds up shipments when necessary. His personal responsibility means convenient ordering, no delays, no mistakes, nor misunderstandings.

(2) *In-stock delivery* of 16,000 specialty steel items, cut or processed to your specifications. Because warehouses maintain these stocks at high levels, you're sure of getting immediate delivery.

(3) *Metalworking assistance.* Experienced service engineers will work with your engineers to solve machining, heat treating or any other metalworking problem.

(4) *Metal research.* Crucible metallurgists visit local warehouses regularly. They'll bring the benefits of Crucible's experience and continuing research to your plant, too.

This service in depth is available because the Crucible operation is completely integrated from ore to steelmaking to warehouse delivery to you. But get full details. Ask the Crucible salesman to list all the services his warehouse offers. *Crucible Steel Company of America, Dept. PC15, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

STOCK LIST

Keeps you up-to-date on local stocks of specialty steels. Just ask the Crucible salesman to place your name on the regular mailing list.

One Source For All These Steels

To speed up cutting on your orders, warehouses are now equipped with the latest hacksaws, and continuous-cutting and self-aligning bandsaws.

Average local warehouse continually replenishes stocks of 16,000 specialty steel items—gives you overnight delivery on almost all.

Sales-service engineers — who specialize in tool steels, stainless, alloys— will gladly help you with any type of metalworking problem.

TOOL STEELS–Water, oil, air hardening, shock resisting, hot work, plastic and die casting steels in all forms, including bars, sheets, plates, drill rod, hollow bars, forgings and flat ground stocks

HIGH SPEED STEELS–Crucible's famous "Rex"® steels: Rex Thrift Finish rounds, hot rolled and cold drawn flats and squares, drill rod, forgings, sheets, plates, and tool bits

STAINLESS STEELS – Bars, sheet, strip, wire, cold heading wire, metalizing wire, plates, angles

FREE MACHINING STEELS – Crucible Max-el®

rounds, hexagons, plates and brake die steel

ALLOY STEELS – Bars, billets, strip and sheet

COLD ROLLED CARBON SPRING STEELS

DRILL STEELS – Hollow and solid drill steels

ALUMINUM EXTRUSION DIE STEELS

HOLLOW TOOL STEEL

WELDING AND HARD FACING ROD

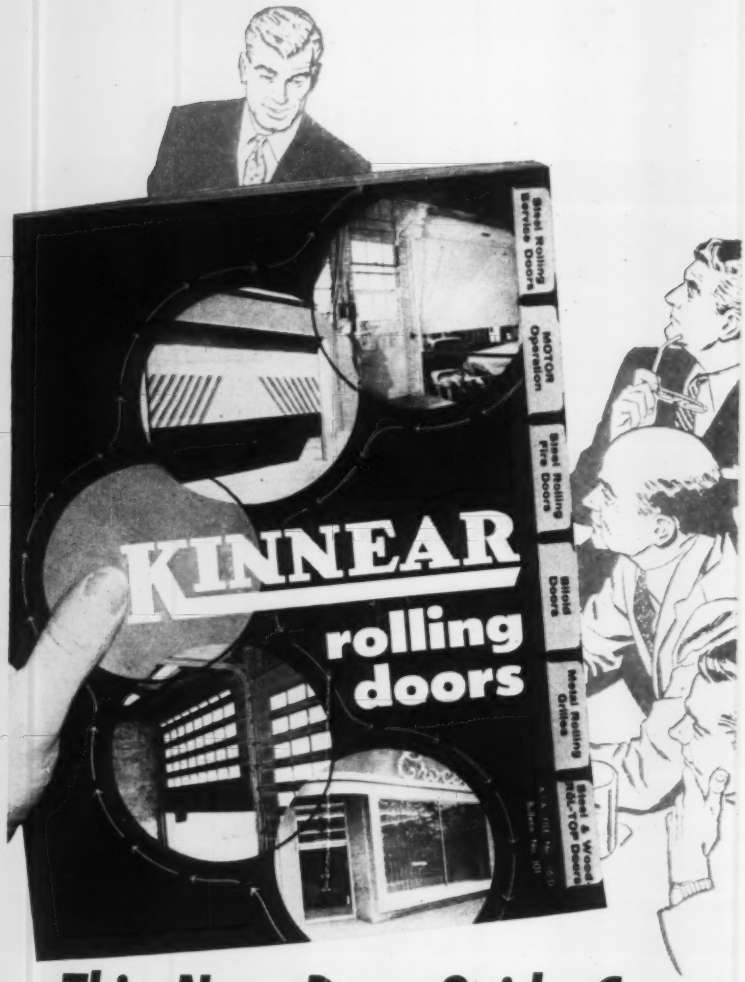
PLASTIC MOLD STEELS

PERMANENT MAGNETS

— and many others

CRUCIBLE STEEL COMPANY OF AMERICA

Branch Offices and Warehouses: Atlanta • Baltimore • Boston • Buffalo • Charlotte • Chicago • Cincinnati • Cleveland • Columbus • Dallas • Dayton Denver • Detroit • Grand Rapids • Harrison • Houston • Indianapolis • Kansas City • Los Angeles • Milwaukee • New Haven • New York Philadelphia • Pittsburgh • Portland, Ore. • Providence • Rockford • Salt Lake City • San Francisco • Seattle • Springfield, Mass. • St. Louis St. Paul • Syracuse • Tampa • Toledo • Tulsa • Toronto, Ont.



This New Door Guide Can Cut Costs at Every Opening!

Write today for this complete up-to-the-minute information on:

KINNEAR Steel Rolling Doors — with the coiling upward action of the famous interlocking-steel-slat curtain (originated by Kinnear). They save space, save time, provide all-metal protection.

KINNEAR Rolling Fire Doors — the exclusive, all-steel "Akbar" doors, famous for positive starting action, safe closing speed, other advanced features.

KINNEAR Steel Rolling Grilles — the protective openwork of steel bars and links with coiling upward action. Admits light, air, and vision when closed — but blocks all intruders.

KINNEAR Motor Operators — Special, rugged, heavy-duty motors that add time-saving push-button control to the many other advantages of upward-acting doors.

KINNEAR Bifold Doors — Heavy-duty service doors of wood or all-steel. Center-hinged to fold upward with easy jack-knife action.

KINNEAR Rol-Top Doors — Sectional doors (wood or all-steel) available paneled for glass in any number of sections.

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The KINNEAR Mfg. Co.
FACTORIES:
1780-1800 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
Offices and Agents in All Principal Cities

KINNEAR
ROLLING DOORS
Saving Ways in Doorways

(*Continued from Page* 91)

added these sales offices: Paul J. Polke Co., 11 Park Place, New York 7, N. Y.; Barker Instrument & Machine Co. Inc., P. O. Box 335, Charlotte, N. C.; and Imperial Industrial Sales Co., 611 W. Market St., Akron 3, Ohio. The Harvey Hubbell firm is a manufacturer of cold headed, rolled thread fasteners.

NEW PLANTS

Cleaver-Brooks Co., Milwaukee, has completed a 25,000 sq ft plant at Stratford, Ont. The packaged boiler manufacturer expects to begin production late this month or early April.

Kaiser Aluminum & Chemical Corp., Oakland, Calif., will construct a plant near Purvis, Miss. It'll have the capacity to calcine 70,000 tons of petroleum coke a year. The coke is used in the manufacture of carbon anodes for the electrolytic cells in the company's primary aluminum reduction plants. Estimated cost: $500,000.

Bay State Abrasive Products Co., Westboro, Mass., has opened a branch office and warehouse at 9550 Granger Rd., Cleveland, Ohio.

Branson Instruments Inc., Stamford, Conn., has opened a factory branch at 12438 Ventura Blvd., Studio City, Calif.

Wheeling Steel Corp., Wheeling, W. Va., broke ground at Southampton, Pa., for a $500,000 corrugated metal culvert pipe plant and bituminous coating facilities.

CONSOLIDATIONS

Economy Fuse & Mfg. Co., Chicago, has become part of **Federal Pacific Electric Co.**, San Francisco.

Raytheon Mfg. Co., Waltham, Mass., and **Machlett Laboratories Inc.**, Springdale, Conn., have

This card assures you *on-time delivery* of sub-contract components and assemblies

It's a small but important part of TMW's electronic punched card scheduling and control system. And it's your assurance that sub-contract jobs, regardless of size or quantity, are delivered *on time*.

You get this when you work with one of the world's largest, most modern and completely integrated manufacturers, whose 65 years' experience in precision (tolerance to 10ths) manufacturing is available to you *now* on either a short or long term basis.

Textile Machine facilities include 1200 modern machine tools of all types and sizes, a completely mechanized foundry (one of the country's largest), 3000 skilled craftsmen, plus a corps of the industry's top designers and engineers.

Combine these facilities with modern electronic production scheduling controls and quality control techniques . . . and you've got the perfect answer to all your sub-contract problems.

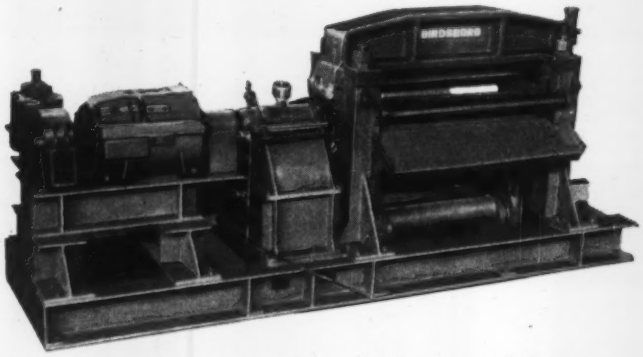
Write today for more detailed information, or for a copy of our latest Facilities File Folder.

TEXTILE MACHINE WORKS

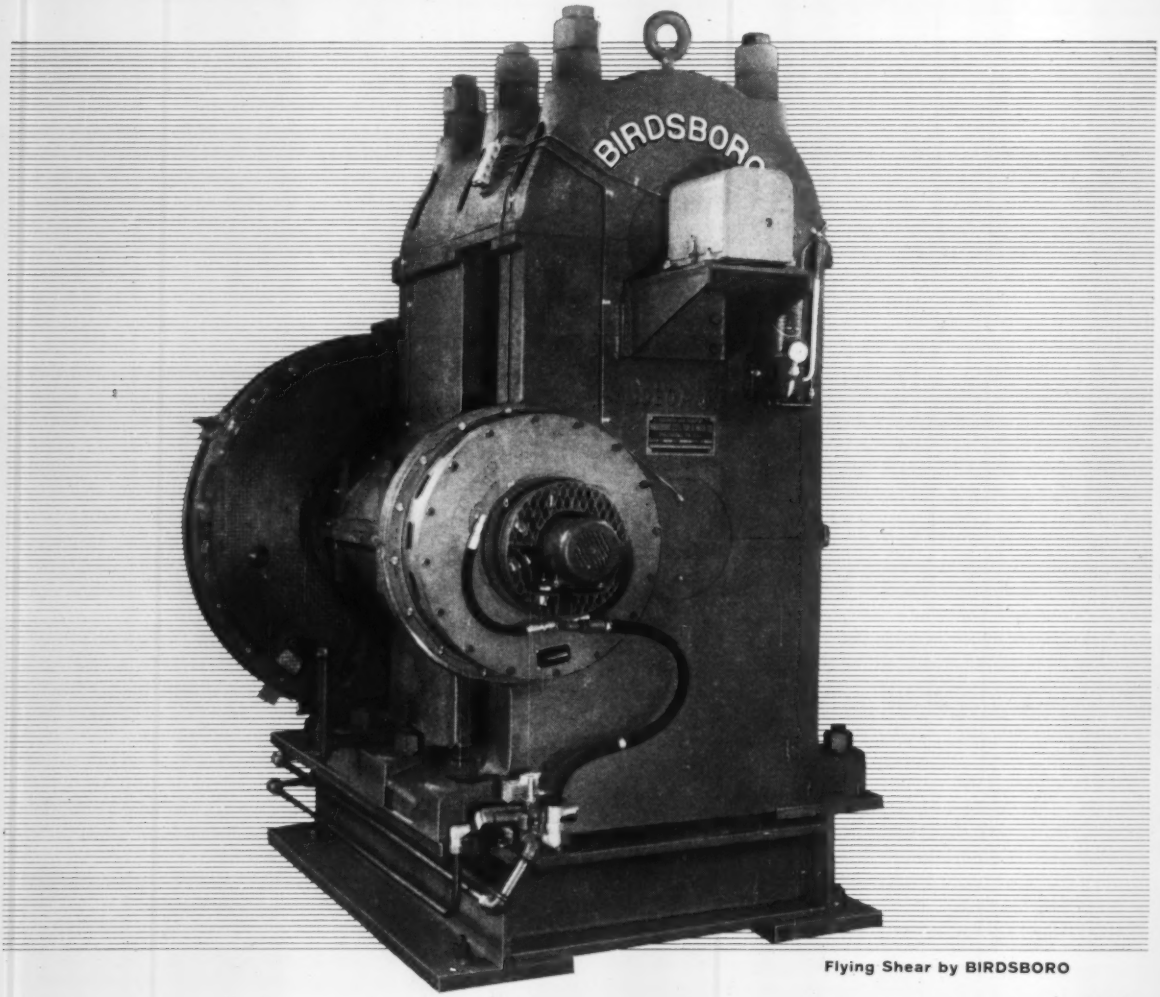
Contract Division • Reading, Pennsylvania

BIRDSBORO

Customized Shear Designs pay off in higher productivity



• Like any other key piece of mill equipment, shears have been given a lot of BIRDSBORO's attention in recent years. As a result, many innovations are available to the mill operator that can eliminate former problems and provide a finer product at a lower cost. BIRDSBORO's shear case history book is a full one. In it you can see a number of firsts, some of them applicable to your operation. The BIRDSBORO representative can help apply creative engineering to your mill. *Sales Department, Engineering Department and Plant*: Birdsboro, Pa., *District Office*: Pittsburgh, Pa.



Flying Shear by BIRDSBORO

MM 73-59

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • STEEL CASTINGS • Weldments "CAST-WELD" Design • ROLLS: Steel, Alloy Iron, Alloy Steel

merged. Machett will operate under it own name and present management as a divisional unit of Raytheon.

Shunk Mfg. Co., Bucyrus, Ohio, has purchased the assets of **Winget Mfg. Co.**, Lima, Ohio, maker of earth moving tools.

Koehring Co., Milwaukee, has purchased **Stardrill-Keystone Co.**, Beaver Falls, Pa., and **Cast-Master Inc.**, Bedford, Ohio.

Kern County Land Co., San Francisco, has acquired control of **Walker Mfg. Co.**, Racine, Wis., manufacturer of automotive equipment.

Northrop Corp., Hawthorne, Calif., will acquire **Page Communications Engineers Inc.**, Washington, and expand into the advanced systems field for long range radio communciations.

NEW ADDRESSES

Babcox & Wilcox Co.'s Atlanta sales office of the Tubular Products Div. has been moved to 464 Peachtree Bldg., 805 Peachtree St. N. E., Atlanta 8, Ga.

Vickers Inc., division of Sperry Rand Corp., has moved its Chicago branch to a new building at 350 N. York Rd., Bensenville, Ill.

International Resistance Co., Philadelphia, has moved its Los Angeles sales office from 12970 Bradley Ave., Sylmar, Calif., to 1136 N. LaBrea, Hollywood, Calif.

NARDA Ultrasonics Corp. is now located at 625 Main St., Westbury, N. Y.

Waverly Petroleum Products Co., Philadelphia, manufacturer of oil and grease absorbents, has moved to 3018 Market St., Philadelphia 3, Pa.

Johnson-March Corp., Philadelphia, dust control engineeering

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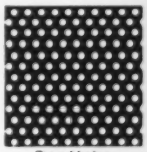
LET H&K PERFORATED MATERIALS

put personality into your products

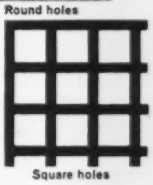


Round holes

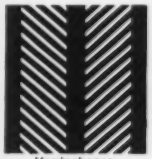
Whenever—wherever—your products require perforated materials, you will find the pattern and open area "just right" for that custom-look in the vast selection of H & K existing dies.

Modern facilities and H & K experienced craftsmanship, enable the perforating of practically all metals, wood, compositions and plastic. Perforated materials can be furnished in sheets, coils, rolls or plates. Fabricating services include shearing, rolling, welding and forming.

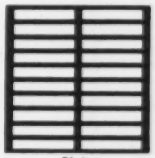
Illustrations shown in reduced size



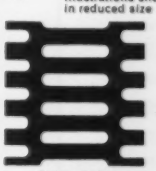
Square holes



Herringbones



Slots



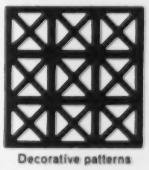
Oblong holes

Functional or Decorative Uses

H & K fills every need for perforated materials. Appropriate perforated metals can be ordered with color anodized, brushed and lacquered, painted, chrome plated, baked-on, or other special finishes.

Many patterns in steel sheets (industrial or decorative) are in stock at our warehouses. Send for H & K Stock List Brochure.

Write for General Catalog No. 75, Today!



Decorative patterns

THE Harrington & King PERFORATING CO. INC.

Chicago Office and Warehouse • *New York Office and Warehouse*

5627 Fillmore Street, Chicago 44, Illinois

118 Liberty Street, New York, New York

FIND NEAREST H&K AGENT IN THE 'Yellow Pages'

Listed Under "Perforated Metals"

Punches & Dies

Since 1903

Made to highest standard and uniform quality thus insuring maximum service.

In Stock

Round, Square, Oblong Punches and Dies, Rivet Sets

Write Dept. A for catalog 60 and new stock list

GEO. F. MARCHANT COMPANY

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Granite City Steel reports up to 125 heats for tapholes "cast" with Permanente 165 Ramming Mix

New technique developed in cooperation with Kaiser Chemicals helps step up productivity of company's open hearth furnaces

Granite City Steel—whose outstanding modernization and expansion program has made it one of the nation's most efficient steel producers—has developed and proved a technique for "casting" tapholes when a furnace is down for ground rebuild. The "casting" practice (described in detail below) has produced the following exceptional results for four recent Granite City tapholes:

Furnace No.	Capacity	Taphole Life
22	250 T	125 heats
23	250 T	113 heats
24	250 T	92 heats
25	400 T	80 heats

Operators who have switched to Permanente 165 Ramming Mix consistently report exceptional performance—whether for new tapholes, for hot tapholes, or for furnace bottoms!

Permanente 165 is made from high purity Kaiser Periclase refractory grains (94-96% MgO) and ceramically bonds itself into a crystalline mass at relatively low temperature, providing fast furnace availability. This monolithic structure has exceptional volume stability, maximum resistance to hydration and to attack by iron oxide and slag. For furnace bottoms, its high density (averaging 175 pounds per cubic foot after firing) assures longer life.

Make your own comparison test and see how much more life you get with Permanente 165 Ramming Mix. Your Kaiser Chemicals sales engineer will be glad to show you this taphole casting technique or to help with any basic refractories job.* Ask to see the new 30-minute color movie, "Progress in Modern Basic Refractories." Your Kaiser Chemicals Sales Representative or Regional Office will be glad to make the arrangements.

*Ask for details on the new K/R Gunning System.

Call or write Kaiser Chemicals Division, Dept. S9222, Kaiser Aluminum & Chemical Sales, Inc., at any of the regional offices listed below:

PITTSBURGH 22, PA. . . . . 3 Gateway Center
HAMMOND, IND. . . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

KAISER CHEMICALS

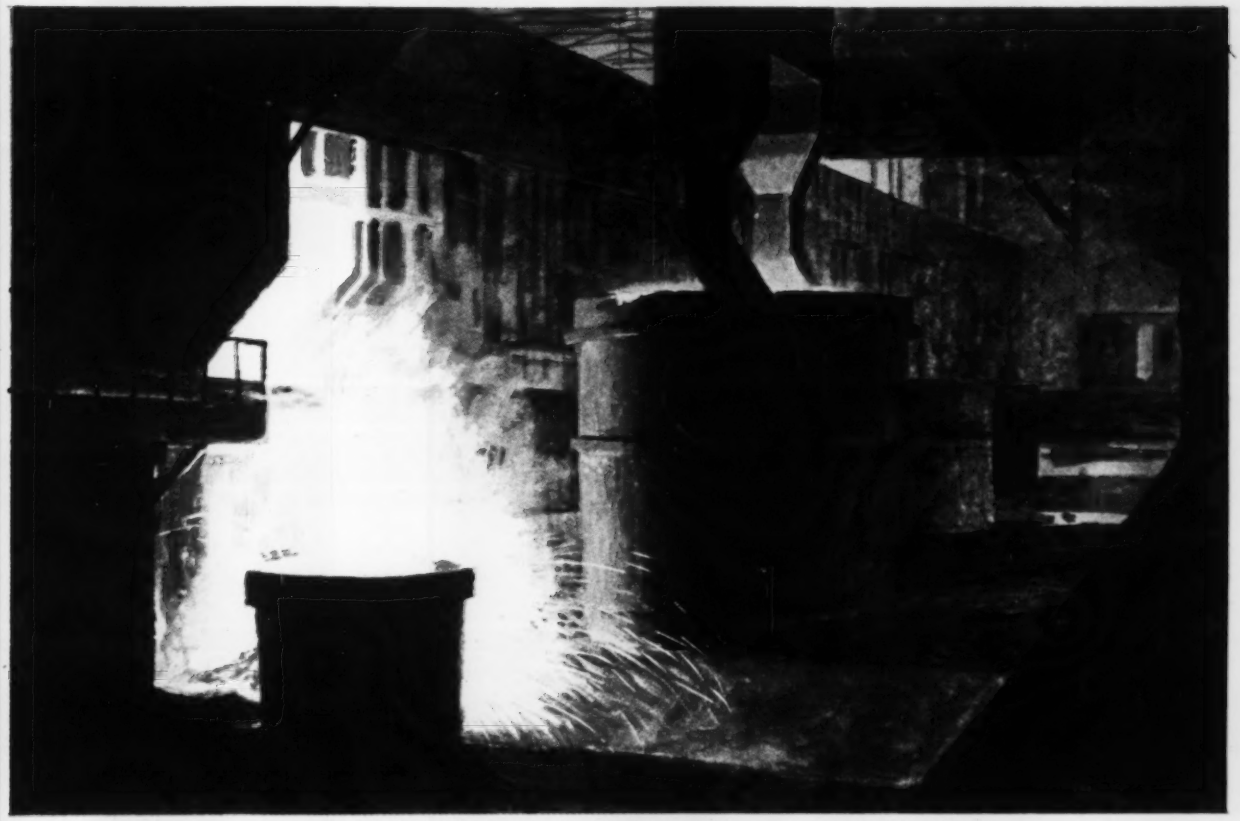
Pioneers In Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • K/R GUNNING SYSTEM
CASTABLES & MORTARS • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

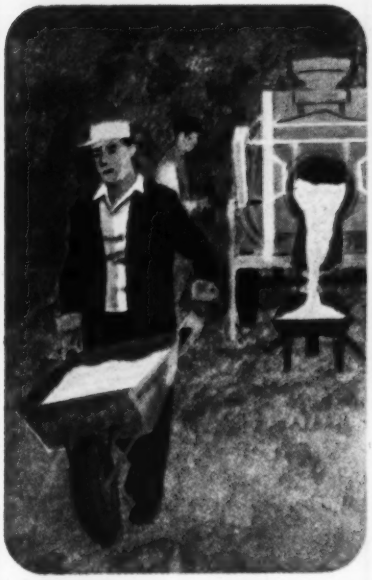
1 In the Granite City Steel practice developed with Kaiser Chemicals, the first step is to dig out the hole to a diameter of approximately thirty inches. Although practices will vary from shop to shop, this digging usually goes down to brickwork under the pipe, and includes two to three feet of the flat in front of the pipe.

2 Next, a ¼-inch steel plate is welded to the casting in back of the furnace and a hole for the taphole pipe is cut in it at the proper height. The pipe is then set at the proper angle, with the back end protruding through the plate and the front end blocked up with brick . . . ready for the casting forms.

3 Carpenters erect a three-sided wooden form, following the indentations of the back banks as closely as practical. A "plug" nailed inside the front wall of the form fits into the pipe, supporting it so that blocking can be removed. Pipe is now welded to back plate . . . form solidly braced . . . and deck built around form.



Open hearth furnaces at Granite City Steel Company, Granite City, Illinois.



4 The Permanente 165 Ramming Mix is mixed in either regular mixers or mixer trucks. From seven to nine per cent water is used. Mix is at proper consistency when a high-frequency cement vibrator immersed in the Permanente 165 produces a "jelly-like" appearance.

5 When the Permanente 165 mix is poured into the form, the vibrator is used to achieve uniform mix density around the entire pipe. *This is the important feature* of the cast taphole: uniform density of mix at least six inches thick around pipe. Excessive vibrating must be avoided to prevent floating out of bond.

6 Although forms can be removed after only three or four hours, life is improved if the Permanente 165 casting is allowed to cure for several days. After the form is removed, the small section of the flat in front of the casting can be filled either by ramming or casting.

earn a

$2,000 DIVIDEND
on PAYROLL DOLLARS/YEAR

with this **new** Impactool
in the hands of an operator

I-R's new ⅜" capacity Impactool has 40% more power than its predecessor. This new tool can help you achieve some quick cost reductions. If the tool operators in your plant are using older Impactools, you could increase their man-hour productivity by as much as $2000 Payroll Dollars per year for each operator, just by replacing the older tools with new I-R 804's.

Here's the way it works! Each of your tool operators probably earns about $5000 a year, but let's say he uses the tool 50% of his time. So $2500 of his annual wage is chalked up to tool operation. By boosting his productivity 40%, you are actually increasing his man-hour output by $1000 Payroll Dollars (40% x $2500). This dividend, or extra man-hour output, possible without adding to your present payroll, is your *Dividend on Payroll Dollars.* If you have 10 operators, that's a $10,000 Dividend.

The best way to fight today's higher production costs is to take the limitations off your man-hour output, and start earning your Dividend on Payroll Dollars.

The fastest, easiest way to do this is to call your Ingersoll-Rand Branch Office today! Or write Ingersoll-Rand, 11 Broadway, New York 4, N.Y.

Ingersoll-Rand

Tools plus AIRengineering increase output per man 8-909

(*Concluded from Page 97*)

firm, has moved to 3018 Market St., Philadelphia 3, Pa.

Jeffrey Mfg. Co., Columbus, Ohio, moved three of its district offices: 3012 Fourth Ave. S., Birmingham 5, Ala.; 7 Wynnewood Rd., Wynnewood, Pa.; and 15-N W. Temple St., Salt Lake City 16, Utah.

ASSOCIATIONS

Strategic Industries Association's executive director, John Marschalk, has resigned to enter private practice as a public and government relations consultant.

Great Lakes Fabricators Association has been formed from the Associated Steel Fabricators of Detroit. W. E. Willard, general manager, R. C. Mahon Co.'s Structural Steel Div., Detroit, is director and treasurer. E. H. Webster, Whitehead & Kales Co., Detroit, is president.

Metal Lath Manufacturers Association, Cleveland, elected these officers: President, E. G. Collins, National Gypsum Co., Buffalo; vice president, J. J. Ryan, Bostwick Steel Lath Co., Niles, Ohio; and managing director, Donald R. Wadle.

Malleable Founders' Society moved to larger quarters at 781 Union Commerce Bldg., Cleveland 14, Ohio.

Society for Applied Spectroscopy has been founded following the dissolution of the Federation of Spectroscopic Societies. Officers are: President, William J. Poehlman, A. O. Smith Corp., Milwaukee; president elect, Mrs. Sarah H. Degenkolb, American Steel & Wire Div., U. S. Steel Corp., Cleveland; secretary (at national office), Rev. J. Devlin S. J., Boston College, Chestnut Hill, Mass.; treasurer, Dr. Edwin S. Hodge, Mellon Institute, Pittsburgh. *Applied Spectroscopy,* formerly published by the New York society, is now the official journal of the new national society. The editor is Dr. Fred C. Strong, Stevens Institute of Technology, Hoboken, N. J.

In the vacuum-pourer shown above, the melt is poured into a low-pressure atmosphere in which the molten stream is dispersed—releasing undesirable gases and other substances.

Special alloys, low hydrogen content steels, finished products—available on short notice from Standard

Even in the face of today's extremely critical requirements in metallurgy, Standard Steel Works has maintained its great reputation for quality and service.

With our electric furnace—and the new vacuum-pouring degasser recently placed in operation—we at Standard have facilities in keeping with industry's demands for steel in all applications.

Samples of vacuum-poured steel are tested for gas content in the analytical laboratory apparatus shown above.

Standard Steel Works Division

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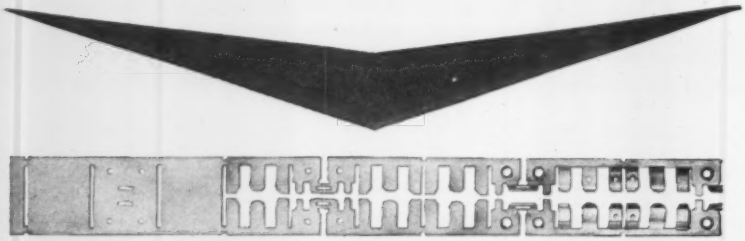
Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes



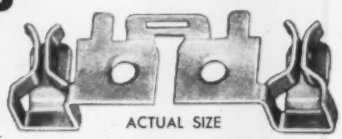
Blanking, Piercing and Preforming in Press

Cutoff

NILSON 4-SLIDE

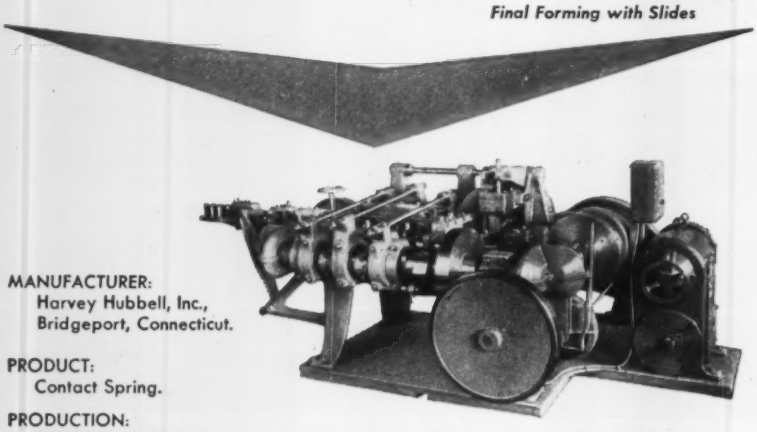
BLANKS *and* FORMS IN ONE CYCLE!

Partial Forming with Slides



ACTUAL SIZE

Final Forming with Slides



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Harvey Hubbell, Inc.,
Bridgeport, Connecticut.

PRODUCT:
Contact Spring.

PRODUCTION:
136 Parts Per Minute.

Nilson 4-Slide Machine with Built-in Press

Harvey Hubbell shifted production of this part from a conventional press and progressive dies to a Nilson 4-Slide with built-in press. The immediate results: elimination of two secondary operations . . . simpler die . . . higher production rate . . . no stripping problems.

Harvey Hubbell also found that vertical mounting of die makes replacement easy . . . permits automatic disposal of scrap by gravity. And maintenance costs are incredibly low—this machine has been operating for twelve years without major repairs!

Nilson builds 7 models of ribbon metal forming machines, with built-in press sections ranging from 5 to 75 tons capacity. One of these machines may help *you* bring your stamping methods up-to-date!

Write today for the Nilson General Catalog on Automatic 4-Slide Equipment.

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AUTOMATIC WIRE & RIBBON METAL FORMING 4-SLIDE MACHINES • WIRE & STOCK REELS • WIRE STRAIGHTENING EQUIPMENT • AUTOMATIC STAPLE FORMING MACHINES • SPECIAL WIRE FORMING EQUIPMENT

Coming Apr. 13

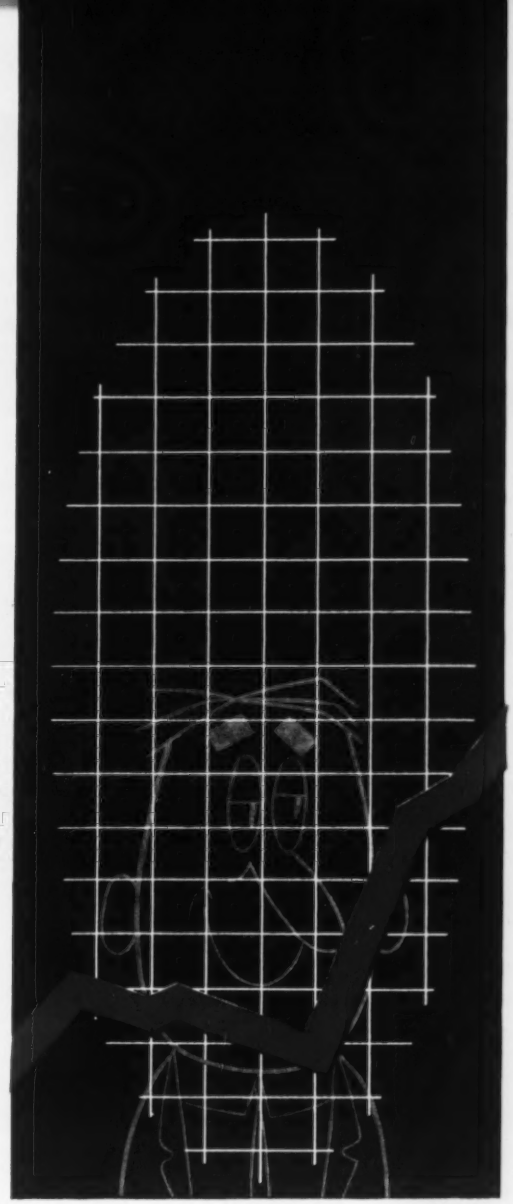
Keeping Wages In Line

The lesson of the last 40 years is clear: When wage boosts outrun productivity improvements, we get inflation. When productivity increases match or exceed pay gains, we have stable prices. The next in STEEL's Program for Management series will show how some companies have been successful in holding pay gains to the pace of productivity. It will show how to compensate for the decline in the owner-manager relationship with workers—a condition that has enhanced union power.

The 1959 Program for Management articles published to date:

1. **Profile of Metalworking's Managers (Feb. 16, p. 137)**
2. **Improving Productivity (Mar. 16, p. 103)**

An extra copy of these Program for Management articles is available until the supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.



Improving Productivity

EVER notice how easy it is for the family team to squeeze a new car or special vacation into its budget by making a limited amount of money go farther?

You can work the same magic for your company. As a metalworking manager, you can get greater productivity from your dollars by using the family approach:

1. You have to set a target and plan your productivity improvement.

2. Every manager in every corporate function can and must participate to get maximum results.

In too many companies, productivity is thought of only in terms of progress on the assembly line—faster, more automatic equipment. Most of us are overlooking the areas which offer the greatest potential for boosting productivity, the nonmanufacturing functions—engineering, administration, purchasing, industrial relations, general office activities.

The tables on Page 107 tell the story: Total employment costs per unit of output have gone up nearly 32 per cent since 1947, yet production worker costs per output unit rose less than 10 per cent. Check your company's employment—both in terms of costs and people. You'll find fewer production workers, substantially more whitecollar and salaried personnel. Now consider the impact of this development on employment costs: Say the union wins a 2½ per cent pay hike—don't forget you have to pass along equivalent increases to your salaried employees!

And don't forget: Technological advances and the growing complexity of doing business are creating a

Boosting Productivity Is Every Manager's Job in Every Function of the Company . . .

WILLIAM T. YLVISAKER

need for more specialists and higher priced talent in industry. This factor makes the need for greater productivity in nonmanufacturing areas even more urgent.

The situation can deteriorate until drastic measures are necessary. J. Russell Duncan, president, Minneapolis Moline Co., cites his firm as an example:

"In 1957, we faced the task of reducing overhead, beginning with the administrative, clerical, and supervisory work force. We had to eliminate several hundred employees—about $3 million annual savings. Now we are doing more business with 25 per cent fewer people and making more profit. If this surgery had not been done, all 3500 present employees would have been out of work."

First Step: Bench Marks

Listen to Henry W. Spitzhoff, vice president of Robert Heller & Associates: "Most productivity gains have come from manufacturing because expenditures and results can be precisely measured. But manufacturing costs seldom amount to more than 35 per cent of net sales. To ignore productivity in the other functions is to lose a degree of control over as much as 65 per cent of a firm's expenditures—and this simply because you've decided measurement is difficult!

"Productivity improvement," he emphasizes, "must be planned. If possible, one manager should head up the over-all program. He should co-ordinate the objectives, have the authority to see that specific projects are initiated and followed though to completion. Planning improvement requires:

1. "That you establish some method for measuring output, whether it's parts per hour, purchasing savings per year, engineering progress per month, research steps accomplished, or grievances initiated and settled.

2. "You must set a standard with which to compare the information you're measuring. It may be inaccurate at first, but set it because you can't evaluate measurement without it."

The logical starting point, productivity experts say, is a budget. There's a definite trend toward getting more managers into budget planning. All managers—foremen on up—help develop budgets involving their activities. They're responsible for staying within them. To make managers more cost and productivity conscious, some firms require them to plan operations under three circumstances:

1. On target—when the company's business is running according to all forecasts and budgets.

2. Operations 25 per cent ahead of activity forecasts. What will the manager's manpower and material needs be?

3. Operations at 25 per cent be-

Let Managers Manage

"TELL the manager what his responsibilities are and what you expect of him.

"Then give him the authority to do the job."

That's the philosophy of William T. Ylvisaker, president of Parker-Kalon Div., General American Transportation Corp. He left the vice president's post of another firm to head up Parker-Kalon about a year ago. His first objective as president: Boost the company's productivity.

"Every manager—down to the foreman level—was brought into the act," he relates. "We challenged him this way. Check all your activities and ask these questions: What can I do without and still get the job done right? What do I need to do the job better?"

Results appeared primarily in three areas: 1. Reduction in the number of people required. 2. Elimination of much antiquated record keeping and report preparation. 3. Installation of new equipment.

Savings amounted to more than $300,000 annually. "This permitted us to reduce our fastener prices and become more competitive," he points out.

"But the real plus factor came from the increased enthusiasm of the managers who could see the results of their individual contributions. Enthusiasm is contagious. As long as managers are exposed to it, productivity can't help but improve."

EARL LIND

Check Paper-Pushing Efficiency

OFFICE ACTIVITY provides many fertile areas for boosting your productivity, suggests Earl Lind, manager of office standards and methods for Joseph T. Ryerson & Son Inc.

Basic reason: Only in recent years has the cost cutting potential of office functions been recognized. Surveys indicate that in many firms where the office routine has received little attention, work efficiency may be as low as 50 per cent.

"By applying the well known industrial engineering techniques for developing work standards and improving methods, you should be able to develop and maintain performance standards at 85 to 90 per cent efficiency," says Mr. Lind.

In what activities will you find the most potential? Mr. Lind recommends these:

- Layout and scheduling of work flow. Does the work flow in as straight a line as possible? Do any employees have to wait unnecessarily for work to reach them?
- Work distribution. Are you keeping the work routinized and matched to the individuals' skills as much as possible?
- Composition of paperwork. How many copies of the documents are necessary? How are they used? By whom? What's their disposition?
- Interdepartmental relationships. Is the paper processing flow logical? Are all departments involved performing a useful function?

L. R. ROTHENBERGER

Help Salesmen Sell

THERE'S MORE to boosting a salesman's performance than dangling an incentive in front of him and telling him to run faster.

"The more help you can give him, the better his productivity will be," says L. R. Rothenberger, vice president-sales for DoAll Co.

When metalworking's sales were slumping last year, DoAll tailored its Headliner program to help salesmen.

It put emphasis on co-ordinating sales on a company-wide basis. Salesmen got special kits of promotional material and presentations. Advertising was timed to coincide with the program. Salesmen were given a calendar of "must" contacts in their territories. Quality, rather than quantity, calls were stressed.

"We were definitely able to measure results," Mr. Rothenberger points out. "Sales of one product in a 60 day period for the Cincinnati territory were 35 per cent above the previous six month average."

DoAll's program for 1959: A correspondence course for salesmen which covers the function and technique of bandsaw machining. Lessons will go to their homes; they'll get special quizzes, plus a final examination next August. Cash prizes will be awarded to those scoring the highest.

Objective: To help the salesman do a better job of fitting bandsaw machining to his customer's requirements.

LYTTLETON PRICE JR.

Isolate Your R&D Costs, Too

HERE are the secrets to getting your money's worth from research and development:

1. Good communications and liaison among R&D and marketing, sales, purchasing, finance, and manufacturing.
2. Good budgeting of time and cost factors in each R&D project.

Rheem Mfg. Co.'s Home Products Div. spends 1 to 2 per cent of sales for research and development, says Lyttleton Price Jr., division director of R&D. "This has never permitted us to do everything we felt should be done, or everything we've been asked to do. So it forces us to exercise good preanalysis of all projects to make sure we're getting our money's worth.

"First, we have a new products planning committee composed of finance, manufacturing, purchasing, sales, and research and development heads. All projects must get the green light from this committee.

"Second, while we can't pinpoint costs as minutely as production, we can break down R&D costs into useful components—such as preliminary designing, prototype building, testing, preparation of drawings.

"About 75 per cent of our projects deal with cutting production costs, keeping pace with design requirements, and developing new features to add sales appeal. Because we can estimate costs of these projects quite accurately, it provides a tool to evaluate the project's worth in terms of profit or loss."

low activity forecasts. How and where will he trim costs to meet the situation?

Given the right challenge with clearcut responsibilities and authority for boosting productivity, managers can come up with surprising results. In the rejuvenation of A. M. Byers Co. (see Page 110), General Tire & Rubber Co. sent its young (35) troubleshooter, Sam Salem, to provide the spark for Byers' management. Result: Even though sales have declined, profit margins have improved. Company earnings per share climbed from a $1.95 loss in 1955 to a $1.98 profit in 1958.

Productivity Up, but Not Enough, Especially In Nonmanufacturing . . .

Isolate Your Costs

Most of the headaches in planning productivity improvement for nonmanufacturing functions have a common source: The problem of isolating costs. Two of the real tough ones are engineering and research and development. Many top managements have been thwarted in improvement attempts by the comment: "You just can't set standards and measure performance in activities that require mental time . . . for thinking and innovating."

True, you won't be able to isolate these costs as minutely as you can those on the production line. But guideposts can be developed. You need look no farther than some of the more successful job shops for proof—their ability to estimate engineering costs often spells the difference between profit and loss on a job.

John A. Patton Management Engineers Inc. suggests using the ratio of delay technique. The principle of measurement involved here is of a statistical nature. Patton suggests analyzing these elements of engineering department activity:

1. Giving instructions. 2. Receiving instructions. 3. Conferring and with whom. 4. Investigating, how and where. 5. Planning and preparing. 6. Action taken by type of operation and where. 7. Wait or idle time and the cause. 8. Personal matters.

In developing summaries of those elements, it is possible to appraise the extent and type of clerical work being done and the extent, type, and cause of "wait or idle" time. Corrective action can be taken to permit better utilization of individuals' time—particularly the higher priced talent—and to remedy the "wait and idle" time situations.

Lyttleton Price Jr., director of R&D for Rheem Mfg. Co.'s Home Products Div., says experience provides the best means of setting R&D standards of performance.

"We break down the segments of each project—such as designing, prototype building, testing, and drawing—into man-month units. Through experience, we can determine, with reasonable accuracy, the time and cost each project will take.

"The payoff—the real measure of productivity—comes from knowing the projected costs of the R&D work and being able to get together with marketing, manufacturing, and purchasing to determine what successful completion of the project will mean in terms of profits."

Get Out of Orbit

Mr. Price's last point—the getting together, communications among functions—is one of the key approaches to productivity improvement. Successful managers no longer orbit within their own function, taking the attitude: "I'll handle my job; let the others stay in their own bailiwick."

The modern role of the purchasing function is a good example. Materials costs frequently amount to 30 to 40 per cent of net sales, making this area one of the best productivity hunting grounds. Because of his contacts with venders of materials and components, the purchasing agent can be a watchdog for product improvement and cost cutting via: The substitution of materials, new components with improved features, cheaper parts which don't reduce quality.

To do an effective job, the PA

PROFITS PRICES

	Percentage return on net worth	Index of wholesale prices of finished goods (1947-49=100)
1958	12.0*	120.8*
1957	12.8	118.1
1956	13.8	114.0
1955	14.9	110.9
1954	12.4	110.7
1953	12.7	110.4
1952	12.3	111.5

Source: Bureau of Labor Statistics.
Classification: All manufacturing.
*Preliminary.

The cost of doing business has risen faster than manufacturers have been able to increase prices. Productivity increases helped offset some of the higher costs, but not enough. So profit ratios continue to drop.

PAYROLLS

	Production worker pay per unit of output[1]	Total pay all employees per unit of output
	Index (1947-49=100)	
1958	109.4	131.9
1957	112.2	130.3
1956	112.1	125.6
1955	109.2	120.0
1954	108.4	120.6
1953	111.3	118.5
1952	109.3	116.2

Source: Bureau of Labor Statistics.
Classification: All manufacturing.
[1]Doesn't include some fringe benefits.

Productivity improvement on the production line has kept production worker pay per unit fairly stable, even with substantial wage hikes. But look at all-employee costs per unit of output—productivity has fallen behind in the nonassembly line functions.

must have good communications and liaison with manufacturing, marketing, and engineering.

Pontiac Motor Div., General Motors Corp., has a material utilization program (MU) which approaches the same objective from a slightly different tack. Its MU committee is chairmanned by C. O. Johnson, general superintendent. Key members include the top managers of all major departments—and many departments have subcommittees. Objective is to direct the program to every employee to stimulate new ideas and examine every part and material used.

The committee meets monthly to review and investigate ideas and suggestions. Officials stress that one of the key ingredients of success is to maintain constant stimulation and interest in the program.

What's the payoff? In its first three years, the committee chalked up savings exceeding $22.5 million.

Emphasis on the team approach to productivity improvement often does two other things: 1. It helps pinpoint the excesses created by the empire builder. 2. It helps hold nonproductive spending in check.

An example of empire building: A midwest industrial relations director expanded his department from 12 to 50 people. The impact was finally felt at the foreman level. Industrial relations specialists had taken over so many of the foremen's functions that the men were little more than straw bosses. The situation led to exceptionally high turnover of good foremen. Result: Productivity fell. Once the cause was spotted, the industrial relations department was pared back to 12 and the rebuilding of a strong supervisory force was started.

Industry is replete with examples where engineering and research and development managers have poured hundreds of thousands of dollars into a project which, when completed, couldn't be marketed profitably. Proper liaison with marketing and manufacturing will help keep these expenditures channeled into profit making projects.

Push Paper Faster

Postwar development of the computers and other office equipment has spotlighted the productivity boosting potential of the office functions. Industrial engineers are putting their time and motion study techniques and tools to work.

Paperwork can be approached in much the same manner as production line operations, points out Royal McBee Corp. Department layout for proper flow of work is important. So is scheduling—to insure proper utilization of individual skills and to reduce "wait and idle" time.

As on the assembly line, there's

How's Your Productivity Rating?

The job starts at your desk . . .

	Yes	No	Sometimes
1. Do you plan your day in detail, then tackle each job systematically —most important first?	____	____	____
2. Do you effectively delegate responsibility and authority so that you have sufficient time for planning and creative thinking?	____	____	____
3. Do you receive only the information you require to make your decisions—or do you demand data and keep them on file just because the same information went to the "man upstairs"?	____	____	____
4. Does your secretary have to retype your letters several times because of your poor dictation and afterthoughts?	____	____	____
5. Be honest. Do you do any unnecessary puttering to maintain the appearance of keeping busy?	____	____	____
6. Do you set a good example for your subordinates when it comes to the 10 minute coffee break rule?	____	____	____
7. Do you waste time by walking to an office when a phone call would suffice?	____	____	____
8. Do you set a personal productivity improvement goal for each week, month, or quarter?	____	____	____

almost no limit to the improvement a little applied imagination can bring. Joseph T. Ryerson & Son Inc. cut by nearly 20 per cent the manhours spent in handling sales orders by switching from conventional cabinet filing to open shelf filing. Savings came from the "look up" and "refiling" time.

Some of the new office equipment looks expensive at first glance, but effective application can save many dollars. W. T. Ylvisaker, president of Parker-Kalon (see Page 104), says his firm's savings from the installation of some IBM equipment should amount to over $10,000 in the first year.

In most instances, first year savings are only the start. Potter & Brumfield Inc., relay producer, installed a Univac 120 several years ago. Major activities handled in the department include: Payroll, material control, cost accounting, subassembly scheduling, and daily sales statistics like bookings, backlogs, shipments, salesmen commissions.

A major campaign to evaluate and improve interdepartmental systems was launched. William Rogers, department manager, says savings came to $36,758. Most of them were generated in the tabulating and production control functions.

Dredge Out the Channels

Here's a basic question to ask when mapping out productivity targets: Are some of our productivity barriers due to poor management organization? The fault can apply to a department, division, or company.

An eastern metalworker was plagued with the usual problems. Sales were below forecasts. Inventories were high, yet many deliveries were slow. Costs were slow in responding to control efforts. The lag between revised sales forecasts and changes in production was often 60 to 90 days.

Attacking the problem with a task force, management discovered four basic organization shortcomings: 1. Responsibility for materials was divided five ways. 2. Three executives had the responsibility for product engineering. 3. Control and financial functions were split between two echelons. 4. Personnel administration was confined to manufacturing.

To correct the situation, responsibility for materials was consolidated under a single manager reporting to manufacturing. Full responsibility for product engineering went to product engineering manager, and control and finance responsibility shifted to the controller. The personnel administration manager's job was broadened to include organization, compensation, manpower plan-

ning, and development.

Under the reorganized structure, sales started to climb; inventories were cut 40 per cent; deliveries speeded up; and the time lag between sales forecast revisions and factory schedule adjustments dropped to ten days. Most important: Profits on sales and investment climbed.

One excellent source for gaining productivity boosting ideas still overlooked by many companies: The suggestion system. Once regarded primarily as a method of anonymously telling the boss where to go for his sun tan, the suggestion box today is a multimillion dollar business.

A prime example: Last year, General Motors Corp. paid employees more than $3.2 million for 256,499 usable ideas.

Suggestion plans have to be carefully thought out, well organized, continually promoted. Most firms peg awards between 10 and 20 per cent of the first year's savings which accrue from adoption of the suggestion.

Keep Pressure on, But . . .

There's no easy road to effective productivity improvement. You have to push for it; it has to be a way of life. It takes the right climate if it's going to survive.

This means that a manager must accept improvement as a basic requirement of his job. It also means that boosting productivity should not provide a threat to him. Consider these:

When layoffs or dismissals of good people follow improvements, how productivity conscious are people going to be?

If a supervisor or staff member co-operates in an improvement program and he and his job are downgraded, will he continue to push for better ways to do things?

If improvements are handled in such a way as to spotlight an individual's errors (why didn't you think of this before?), will this encourage suggestions?

Or suppose an idea for improvement in purchasing originates in the sales department. Will the offhand comment, "it's a good thing somebody gets the ideas around here," stimulate better co-operation between the two departments?

In a recent talk before the American Management Association, A. Lightfoot Walker, president of Rheem, pinpointed the type atmosphere that's needed.

As we emerge from the recession, he said, you hear the term "back to normal" being used. Managers have guided their firms through a difficult period—carried out economy drives, cut overhead, trimmed the fat. "Back-to-normal" leadership implies that general increases

Eight 'Managers' Who'll Block Improvement

DAN DIFFERENT	"But it won't work in our department. Our situation's different."
NO GUTS GEORGE	"It's too radical. We can't chance it."
PLODDING PAUL	"We can't afford the time to go into it now."
CAUTIOUS CARL	"Anybody else tried it? We'd better wait."
WEAK SISTER SAM	"We're just too small to try something like that."
COLDWATER CHARLES	"Won't work. We tried something like that ten years ago."
WHOLE-SHOW WILLIE	"I'm just too busy to take it on—and there's no one else capable of handling it."
STODGY STAN	"We've always done it this way—why upset the applecart?"

Men responsible for Byers' record (right) listen as Sam Salem, vice president-general manager, outlines new profit objectives. Left to right: R. Griem, secretary; N. J. Johnson, manager of operations; A. S. Chalfant, vice president-sales; Mr. Salem; W. J. Gurtner, treasurer-controller; W. H. Harper, assistant controller; F. Engelhardt, director of traffic and purchases

Reorganization, New Products Help Hike Profits As Sales Slip . . .

	Sales in millions	Profits after taxes
1958	$23.6	$810,000
1957	$29.7	$566,000
1956	$32.2	$564,000
1955	$23.6	$222,000*

*Equals loss.

NET EARNINGS up 43 per cent in 1958 . . . first quarter profits for fiscal 1959 five times those of the same period in fiscal 1958 . . .

That's the story at A. M. Byers Co., Pittsburgh. Earnings have been riding an upward trend since 1954, thanks to reorganization, cost reduction, and changes in product mix.

The company, founded in 1864, is a leading producer of wrought iron products—pipe, condenser tubing, plates, bars, rounds, and squares. It was a marginal supplier of carbon steels from 1941 (when it installed electric furnaces) until 1958.

When Byers was acquired by General Tire & Rubber Co. in 1956, it had one big asset: A respected name in wrought iron. It had growth possibilities in specialty steels and a sales force that could handle plastic pipe made by another General subsidiary. It also had problems. Byers meant "integrity" but not necessarily "progress." Stockholders had been trying to unseat its management. It couldn't compete in carbon steels, as the 1954 recession demonstrated (sales fell 97 per cent).

General Tire set out to give Byers a new look and a sound earning position. Sam Salem, a troubleshooter from the parent company, and B. M. Byers, president, initiated this program:

- **Complete reorganization (dismissal or retirement of unproductive employees; promotion of middle managers; recruitment of top administrative and technical talent).**
- **Switch in product mix from commodities (carbon steels) to specialties (alloy and stainless steels in plates, bars, and semifinished forms).**
- **Drive to reduce costs. Methods: Establish incentives to spur productivity; increase yields through better controls; reduce raw material costs through better purchasing; eliminate featherbedding at all levels.**
- **Start of a crash R&D program. First development: "4-D" wrought iron, a highly successful product which surpasses older types in corrosion resistance and physical properties but costs no more.**
- **Greater emphasis on sales, distribution, and advertising. (Byers organized a steel sales department; spent more for advertising in 1958 than in any previous year.)**
- **Search for new markets for wrought iron and promotion of its use by original equipment manufacturers, architects, and industrial engineers.**

---

will again become automatic; labor disputes will be settled to avoid production stoppage; it will be easier to get approval on requisitions for extras.

What's really needed, Mr. Walker emphasized, are more "productivity thinkers." (Managers who won't backslide as business improves.)

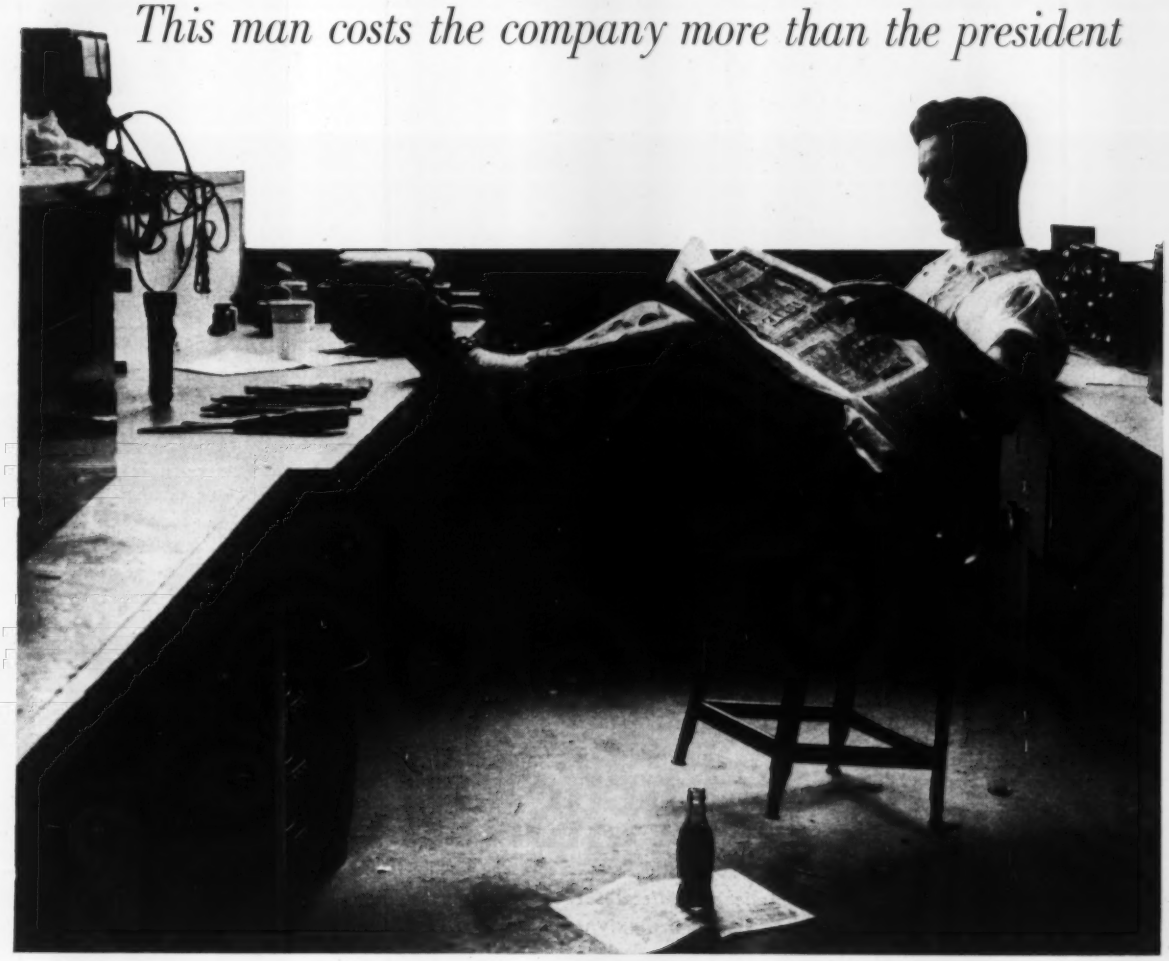
Because of the upcoming steel industry negotiations, productivity will be one of the most popular words in our language between now and next summer.

Labor will be talking about productivity as output per manhour. But labor actually represents only one input factor contributing to productivity. These elements, and particularly the way they're used, are equally important: Capital, equipment, materials, technology, and management.

Industry's job will be to effectively demonstrate to—and convince—the public of this balanced role in productivity gains.

Your job in looking for better ways to do things is to make sure you consider all the elements, too—so that you can generate enough productivity increases to talk about.

This man costs the company more than the president



At $800 a week, the company's top man is a real bargain. He works hard at the right things, gets a lot accomplished.

At $80 a week, this plant electrician (Sam's his name) is an extravagance – because he doesn't have *enough* to do.

Sam totes his tool box into a number of departments each day. Sometimes he finds work, sometimes he doesn't. When the reports come in (two weeks later), there's no sure way of telling whether he pulled his weight or not. He's chalked up to "overhead"... and a potential bit of profit gets lost in a catch-all figure. Year after year.

How to get your money's worth out of Sam? With Automatic Keysort punched-card controls. Keysort will give you a daily break-down of indirect labor (including maintenance) *by department*. Knowing the facts *on time*, you can keep costs on target by spotting wasted man-hours, pinning down undue fluctuations.

Automatic Keysort is today's only data processing system that provides a family of integrated machines and methods designed for the automatic creation and processing of original records. Speeding vital day-to-day and long-range facts essential to sound management, this unique system fits easily into your present operations... is highly flexible to future growth and expansion.

With the Automatic Keysort System, manufacturing concerns of every size can now enjoy fast, accurate data processing on either a centralized or decentralized basis. Without restrictive, complex procedures. Without specialized personnel. And at remarkably low cost.

Call your nearby Royal McBee Representative, or write Royal McBee Corporation, Data Processing Division, Port Chester, N. Y. for illustrated brochure F-2. In Canada: The McBee Company Ltd., 179 Bartley Drive, Toronto 16.

ROYAL McBEE · *data processing division*

NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION

CALCIUM SILICON

VALUABLE and VERSATILE!

Airborne jack-of-all-trades is the helicopter. Used for everything from mercy missions to eyes-in-the-sky reconnaissance, the extent of the whirlybird's versatility seems limited only by the imagination.

Calcium silicon and calcium manganese silicon offer similar versatility to steel producers. Dependable deoxidizers and degassifiers, these calcium alloys are widely used in production of bearing, aircraft quality and stainless steels. They also are extensively used in production of both alloy and carbon steel castings to assure maximum physical properties. Calcium silicon is an excellent inoculant for low carbon, equivalent-high tensile cast irons.

Ohio Ferro-Alloys is a major producer of both calcium silicon and calcium manganese silicon. Stocks of lump and crushed sizes for furnace and ladle additions are maintained at our conveniently-located plants and warehouses. For information on how these alloys may benefit you, contact our nearest sales office.

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Ohio Ferro-Alloys Corporation
Canton, Ohio

Boston, Birmingham, Chicago, Denver, Detroit, Houston, Kansas City, Los Angeles, Minneapolis, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Vancouver, B. C.

FOR EXTRA CONVENIENCE

Many users prefer to receive their calcium alloys in bags containing exactly 50 lbs. delivered in convenient-to-handle pallet crates holding approximately 1800 lbs.

MORE PLASTIC-STEEL COMBINATIONS— Add two new ways to combine vinyl and steel: B. F. Goodrich's A978B cement and Stanley Chemical Co.'s 69X-1487. Both firms claim normal metalworking processes can't separate plastic and steel joined by such adhesives. Goodrich says you can draw the metal some 35 per cent without damaging the bond.

WELD COMPETITOR— A rubber gasket joint for large pipe (3 ft to 10 ft diameters) is said to eliminate much of the welding needed for pipelines. The developer, Kaiser Steel Corp., Oakland, Calif., says it puts steel pipe construction more in line with concrete pipe costs.

STRONGER TITANIUM— For service above 1000° F, cerium dioxide makes titanium noticeably stronger, says the Army Ordnance Corps. Cold rolled, 0.010 in. sheets of cerium-titanium alloys were annealed and internally oxidized to produce a fine dispersion of the cerium dioxide. (You can get complete details in PB 131788, OTS, Department of Commerce, Washington 25, D. C. Cost: 50 cents.)

CHEAPER INERT GAS— Welders and metal processors may be able to buy argon for 5 cents a cubic foot next year, STEEL has learned. Despite inflation, the price has steadily declined. Reasons: Technical advances and increased volume.

BETTER ALUMINUM FOR REACTORS— Adding 0.9 to 1.3 per cent nickel to 1100 aluminum inhibits hydrogen pickup from high pressure, 400° F water in nuclear reactors. The improvement in cladding was made by Alcoa and Argonne National Laboratories, Lemont, Ill.

HELP FOR DIECASTING PLUNGERS— Alkalinity is the secret behind a new family of lubricants for the plungers on cold chamber diecasting machines. Former lubricants changed from an alkaline to an acid condition too quickly and caused pitting and erosion of nitrided plunger skins, tips, and shot sleeves. The new lubricants have melt, flash, and boiling points which are higher than molten metal temperatures in the shot well, says Chemical Products Div., American Charcoal Co., Detroit.

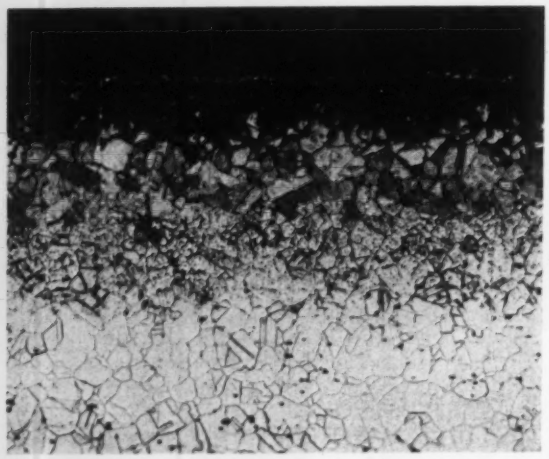
WATCH PLASMA JET— The plasma jet will progressively invade fields now dominated by oxyacetylene, experts tell STEEL. It is an unbeatable source of heat, makes extra clean cuts in almost any material, including ceramics, and you will be able to weld with the same device. Practically all the major welding machine builders are working on their own version.

HIGHER OUTPUT OF STEEL— A new method of removing silicon and sulfur treats hot metal in a rotary reactor with an alkaline material, iron ore, and oxygen. When the product (wash metal) is used in the furnace charge, it can increase open hearth output 15 per cent or electric furnace output 50 per cent, says Diamond Alkali Co., Cleveland. The method could become part of a direct reduction process.

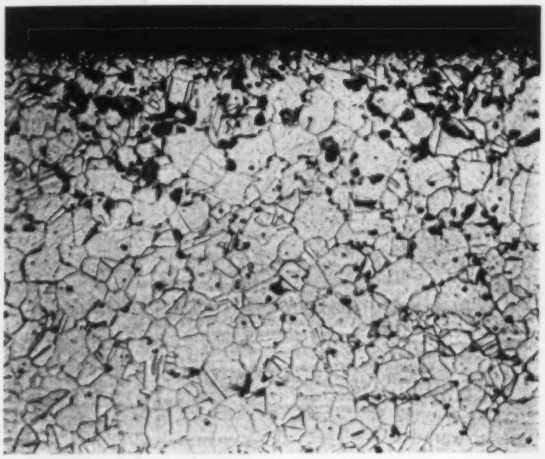
CHEAPER CRATING— Aluminum containers for overseas shipments save labor and reduce handling costs as much as 50 per cent, says Twin Coach Co., Buffalo, which makes a wide variety of such crating. Cargo—from home appliances to buses—can be packed in the crates by a shipper in his own factory with regular tooling.

GLASS ADHESIVES— Glass is being studied as a high temperature adhesive. Development work is being done at A. O. Smith Corp., Milwaukee.

UNMIXER— The E-machine is an electrostatic device that will separate dry mixed particles. Made by General Mills Inc., Minneapolis, the device is expected to cut the cost of recovering many valuable minerals from waste piles and mining locations (beaches, for example). The firm is seeking ideas for other applications.



Photomicrograph (X150) shows contamination resulting on the original stock surface because of heat treating atmosphere. Bolt was produced on a cold header, solution treated at 1800° F, aged at 1325° F for 16 hours



Photomicrograph (X150) shows lamellar precipitate resulting from solution treatment at 1650° F. Bolt was produced on a cold header, solution treated at 1650° F, aged at 1325° F for 16 hours

How To Increase High Temperature Reliability of A-286 Fasteners

Study indicates that six design and fabrication techniques can greatly extend their life. Lack of proper procedures in present practices has jeopardized future use of the material

MUCH of the unreliability of A-286 bolts can be traced to fabricating practices, believes Robert L. Sproat, chief metallurgist at Standard Pressed Steel Co., Jenkintown, Pa., and head of SPS Laboratories.

To back his premise, SPS Laboratories did exhaustive research to determine the effects of solution heat treating temperature, method of forming head and thread, surface finishing, and thread contour on bolt life and performance.

The conclusion: The observance of six basic design and fabricating techniques—none of them particularly complex or costly—will greatly enhance the reliability of the fasteners. Each step may extend bolt life at elevated temperatures by as much as five to ten times. Many are lacking in present practices.

Steps to Success

• **Cold Working**—A minimum of 15 per cent throughout the body of the fastener is required before solution heat treatment. Anything less may reduce stress rupture life as much as 80 per cent.

• **Forged Heads** — This technique gives uniform, contour - hugging metal flow lines. Machining of heads from bar may cut stress rupture life by 90 per cent.

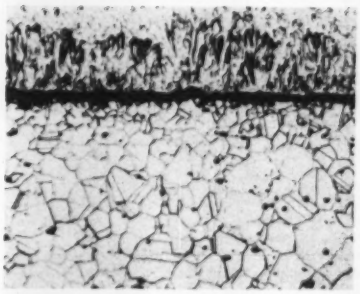
• **Heat Treating** — Temperatures should be at least 1800° F. (1650° F, frequently used because of furnace limitations, may reduce fastener life by 60 per cent.)

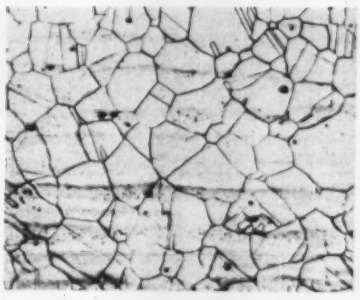
• **Finish Grinding**—This is necessary on all bearing surfaces, shank, and thread area to remove contaminated material, much of which is a carryover from the raw stock. Bolts made without a finish grind may have 70 per cent less life.

• **Rolled Threads** — The ground, milled, or cut threads that are permitted in some turbine specifications greatly reduce stress rupture performance. Cut threads may lower it as much as 80 per cent.

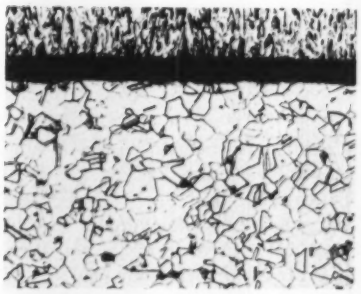
Effect of Fabricating Procedure on Microstructure

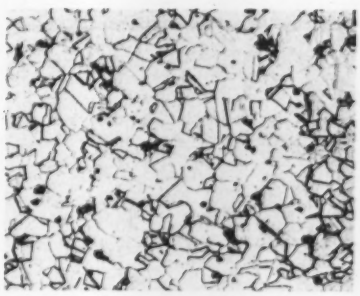
Photomicrographs (X150) show surfaces and cores of bolts produced in varying sequences of fabricating operations, and heat treated at different temperatures. The surfaces of all specimens were nickel plated to retain the edge in micro preparation.



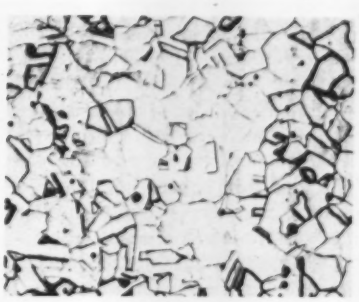


Fabricated with original stock surface. Produced on a cold header, solution treated at 1800° F, aged at 1325° F for 16 hours

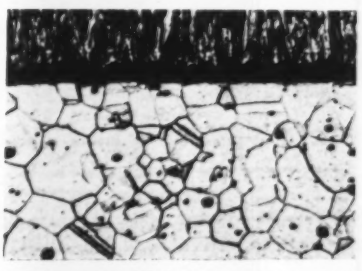


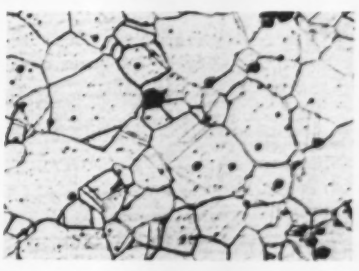


Produced on a cold header, solution treated at 1650° F, aged at 1325° F for 16 hours



Fabricated to AMS 7479. Annealed at 1800° F, hot forged, solution treated at 1650° F, aged at 1325° F for 16 hours





Fabricated to AMS 7478. Produced on a cold header, solution treated at 1800° F, aged at 1325°F for 16 hours

• **Thread Root**—A large, continuous radius is needed. Most specifications allow threads with no radius in the root. One thread form having a large radius in the root increases stress rupture life sevenfold over standard aircraft threads.

Background of A-286

Since World War II, the A-286 alloy has been one of the most useful bolting materials for service at 1000 to 1200° F. It was developed in the search for a jet engine material with good high temperature tensile and stress rupture life.

It has a minimum room temperature tensile strength of 140,000 psi. Notched stress rupture life is a minimum of 23 hours at 65,000 psi and 1200° F.

Standardized by specification AMS 5735, the material has this composition: 15 per cent Cr, 26 Ni, 1.3 Mo, 1.9 Ti, 0.3 V, balance Fe.

• **Fabrication Procedure** — Two AMS specifications cover fabrication. The mechanical property requirements for the finished products are the same in both. But the raw material properties, the heat treatment procedures, and the sequence of the threading operation with respect to aging are different.

AMS 7478 requires that the annealed material be cold reduced in cross section 15 to 25 per cent before solution treating at 1800° F. The threading operation must be done after solution treatment and before aging at 1300 to 1400° F. No consideration is given to grinding operations or to thread root radius.

AMS 7479 specifies that heads be machined or upset from solution treated material. The solution treating temperature is 1650° F. Threads must be rolled before aging at 1300 to 1400° F. Grinding is not mandatory, nor is root radius controlled.

• **Many Methods Used** — Several suppliers are using material with different degrees of cold working. The less cold working in the raw material, the easier the upsetting operation.

The majority of A-286 bolts have been produced by cold upsetting the heads or by hot-cold forging

them at 1600° F. The bolts are heat treated by a solution and precipitation aging treatment. Temperatures of either 1650 or 1800° F are normally used.

The surfaces on some parts are ground, while others are not. Grinding can be done after solution treatment and before aging, or after heat treating.

Threads are normally formed by rolling—but this may be before or after aging. Some are cut or ground. Inconsistent radiuses at the root of the threads have resulted.

• **Performance Inconsistent**—Many methods of fabrication are not adequate. An increasing number of service failures has resulted.

One enginemaker reports thread stripping of assembled units. Another is plagued with bolt head failures. In another case, unreliable fasteners expanded excessively with time and temperature to permit pressure leakage through bolted jet sections.

• **Still Best Material** — A-286 has been the most popular bolting material for the 1000 to 1200° F range because it is less costly and more easily fabricated than the more advanced nickel and cobalt base alloys that must be the inevitable next choice, explains Mr. Sproat.

He cautions: Think twice before you abandon it. The material is well suited for many fastening applications in aircraft, engines, missiles and rockets, gas turbines, powerplant equipment, and other areas.

The metallurgist feels that stress rupture data are absolutely necessary for evaluating at-temperature bolt performance. In his research, tensile and hardness values weren't much help in predicting the performance of specimen bolts. Even at-temperature tensile and fatigue testing were not reliable indicators of 1200° F performance.

Results of Research

In the SPS Laboratories study, tests were made on 5/16 in. diameter bolts with National Fine series threads. All parts were produced on a Boltmaker. They were made from the same lot of material in the same machine setup.

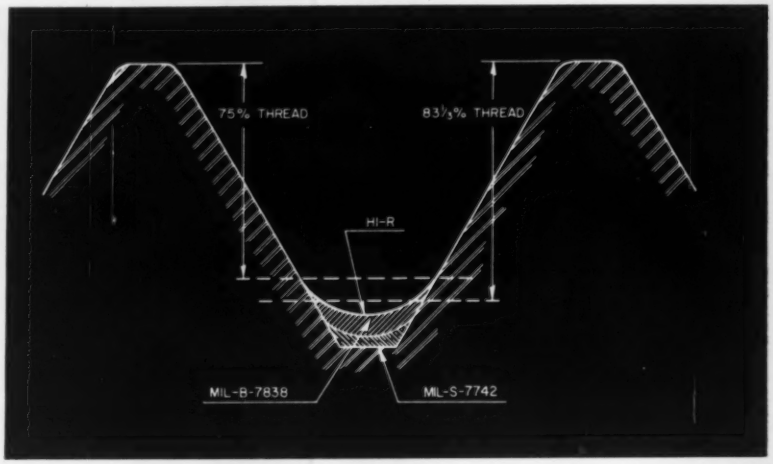
Parts fabricated to the AMS 7479 specification were solution treated to 1800° F before heading. Parts completely machined from bars were fabricated from stock which had been cold drawn 15 to 25 per cent.

• **Results of Grinding**—Bolts with the original stock surface intact had much lower stress rupture and fatigue life than parts which were ground. Lot No. 1 was made without grinding. Otherwise, it was processed the same as Lot No. 4. But Lot No. 1 had a stress rupture life of 30 per cent and a fatigue life of 29 per cent that of Lot No. 4.

If the atmosphere in the heat treating furnace is not controlled, the surface of the bolts becomes contaminated. The susceptibility to contamination is much greater with an original stock surface than with a ground surface.

• **Results of Heat Treat**—A solution treat temperature of 1650° F produced lower stress rupture and fatigue life than did solution treat at 1800° F. Material treated at 1650° F had a stress rupture life of 38 per cent and a fatigue life of 70 per cent that of parts treated at 1800° F.

The lower temperature may produce a lamellar precipitate which lowers elevated temperature performance.



Comparison of thread root radiuses allowed by various specifications

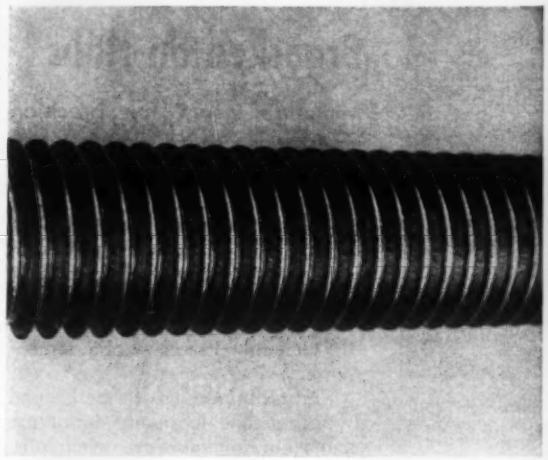
• **AMS 7479 vs. AMS 7478**—Parts fabricated to the AMS 7479 specification have higher fatigue and tensile strength but much lower stress rupture life. The fatigue life of AMS 7479 parts is 166 per cent that of AMS 7478 material. But stress rupture life of the higher strength material is only 19 per cent that of the lower strength parts. The greater fatigue and tensile performance stem from cold work by threading after aging.

• **Effect of Root Radius** — Use of the SPS Hi-R (large radius) thread form increases stress rupture and fatigue life through the reduction in stress concentration in this critical area.

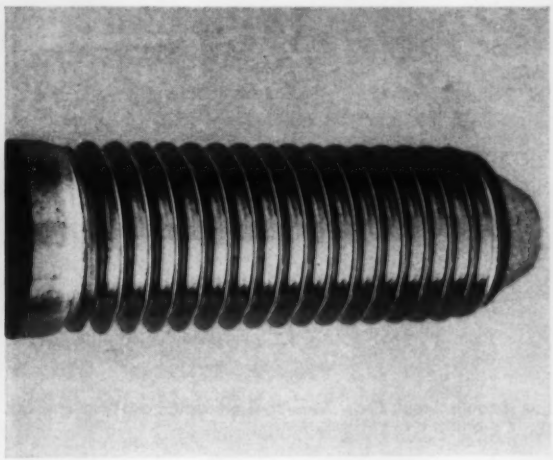
The aircraft thread of Mil-B-7838 requires a continuous radius blending to the thread flank with an uninterrupted smooth surface. The radius is the largest that would be tangent to the thread flanks at a minimum depth of 83 1/3 per cent of thread height. A negative tolerance is allowed.

Most nuts are tap drilled to a thread depth of less than 75 per cent. The Hi-R thread utilizes the difference in thread depth between 75 and 83 1/3 per cent to fit in a larger root radius. This thread form is described in specification SPS-T-105.

In elevated temperature applica-



Cut threads have a rough surface finish



Rolled threads have a smooth surface finish

tions, the pitch and major diameters of threads are normally reduced 0.003 in. to eliminate galling and seizing.

To determine the effect of root radius, Standard Pressed Steel Co. compared bolts that had flat roots with those that had the Mil-B-7838 radius. Bolts with no root radius had a stress rupture life of 29 per cent and fatigue life of 55 per cent that obtained on parts with the aircraft thread radius.

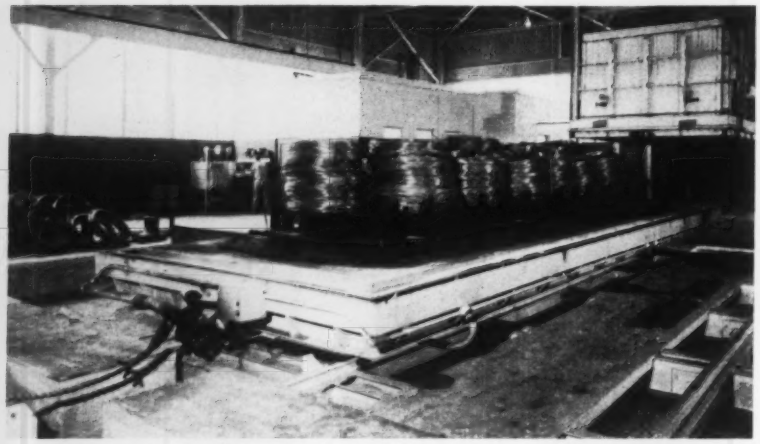
• **Rolled vs. Cut Threads** — Bolts with cut threads show up with low fatigue and stress rupture life. The fatigue life of a cut threaded part is about 50 per cent that of a part with rolled threads. The relative stress rupture life is only 13 per cent of roll threaded parts.

Size can be maintained more closely by rolling. The surface finish is also superior. The roughness of the surface of cut threads possibly creates points for the start of fractures and eventual fatigue and stress rupture failures.

• **Machined Head**—The stress rupture life of a machined head is less than 10 per cent that of a forged head. The shortened life is probably due to planes of weakness produced by breaking the fibers of the material.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, *Penton Bldg., Cleveland 13, Ohio.*

ROBERT L. SPROAT, chief metallurgist at Standard Pressed Steel Co. and head of SPS Laboratories, did most of the work on A-286 for his company. His six design and fabricating steps to better material performance come at a time when A-286 users are considering a change in the composition of the alloy or a lowering of performance standards. "If the proper design and fabricating techniques are observed, bolt life at elevated temperatures can be raised five to ten times," he affirms.



Precision Drawn Steel Co.'s new controlled atmosphere carbottom furnace

Batch Furnace Helps Firm Meet Varying Requirements

WHEN you have to heat treat a large volume and variety of work in job lots, the batch furnace is often your most practical type of equipment.

Precision Drawn Steel Co., Camden, N. J., has gained closer metallurgical control over the steel it processes and has enlarged its product line by adding a new car bottom furnace.

Built by Lee Wilson Engineering Co., Cleveland, the radiant tube, controlled atmosphere unit is used for bright annealing, structure control, carbon restoration, and stress relieving.

• **Customer Benefits**—One of the major product improvements made possible is the restoration of carbon to the surface of bars. It permits hardening of cold-drawn bars without machining to remove a decarburized layer.

Cold-drawn bars generally have 25 per cent greater tensile strength, 70 per cent greater yield strength, and 15 per cent greater hardness than their hot-rolled counterparts, says George B. Troup, metallurgist at Precision Drawn Steel. But cold drawing sets up stresses which must be removed.

A stress relief heat treatment minimizes the distortion which could occur in certain machining operations, while retaining the improved machinability and most of the high mechanical properties of the cold-drawn bar.

• **Structure Refinement**—The metallurgical structure of a steel bar is often as important as its strength and stress conditions. Example: In the medium carbon range, an alloy steel with a spheroidized structure may be good for turning, poor for forming, fair for drilling, and poor for broaching.

With the addition of the Lee Wilson furnace, the steel company can furnish tailormade structures.

A metallurgical laboratory adjoins the furnace area. It is equipped to analyze gas and carbon potential for the furnace atmosphere, tensile and hardness testing of heat treated or cold drawn material, and metallography for control of metallurgical structure. It is also used to make chemical analysis of incoming steel.

High Torque Gears Broached on Hubs

Miniature gears for precision equipment are concentric when they are mounted this way

A KNURL broaching technique for mounting precision gears on hubs with no loss of gear concentricity is announced by Librascope Inc., Glendale, Calif., a subsidiary of General Precision Equipment Corp.

The technique was formerly used by Librascope to mount miniature shafts on linkage arms, when normal fastening methods couldn't be used. Parts show better torsional and tensile strength than those joined by other methods.

• **Make Small Gear Units** — The method, developed by Willard J. Opocensky, staff engineer, is used to make a new, two pinion differential that's only 0.980 in. long and weighs 1.06 ounces. Applications: Analog computers, flow totalizing meters, and other electromechanical equipment.

• **Knurling Solves Problem** — In most of the units, the ring gears, or side drive gears, are too small to accommodate pins or setscrews. Drilling and tapping the gears caused loss of concentricity during thermal expansion. Increased backlash and gear damage resulted.

The solution: Adapt the knurl broaching method. A fine pitch knurl, usually 80 pitch, is applied to the hub surface. It increases the hub diameter by 0.004 to 0.005 in. The base of the hub is knurled just less than half the width of the ring gear to be applied. A groove is machined around the hub at the leading edge of the knurl. It cuts across the end of the knurling and forms sharp edges that act as microscopic broaching teeth as the ring gear is pressed on the hub. The groove also collects material removed and prevents galling or spalling.

A press fit is made without special tools. If necessary, gears can be removed, the chip groove cleaned, and another gear pressed on. For a permanent fit, the gear can be staked in position.

Judges for STEEL's Cost Crisis Awards Competition

During 1958, hundreds of readers told STEEL how they had cut costs through more efficient use of capital equipment. Their stories became entries in the Cost Crisis Awards Competition. Now they are being judged. TEN WINNERS will be selected—two from each of five plant groups.

The metalworking managers listed here are the judges.

- **They represent four equal groups of managers in**
  - Administration
  - Production
  - Engineering
  - Purchasing

- **An equal number in each category represents five employment groups**
  - Under 100 employees
  - 100 to 249 employees
  - 250 to 499 employees
  - 500 to 999 employees
  - 1000 or more employees

- **In the five largest segments of metalworking**
  - SIC 33 (Primary metal industries)
  - SIC 34 (Fabricated metal products)
  - SIC 35 (Machinery—except electrical machinery)
  - SIC 36 (Electrical machinery)
  - SIC 37 (Transportation equipment)

LIST OF JUDGES

O. GOLDSMITH, Chf. Engr.
Truck Engineering Co.
Ft. Wayne, Ind.

H. CODA, Chf. Engr.
American Research & Mfg. Co.
Rockville, Md.

ALBERT C. BARTH, Chf. Engr.
Orrville Metal Specialty
Orrville, Ohio

M. DENICK, Chf. Engr.
Farrell Mfg. Co.
Joliet, Ill.

F. HYATT, Chf. Engr.
Mackenzie Muffler Co.
Youngstown

W. HEYD, Chf. Engr.
Smith-Morris Co.
Ferndale, Mich.

F. E. ROGERS, Res. Engr.
Fruehauf Trailer Co.
Memphis, Tenn.

M. CELOSKY, Chf. Engr.
Lyon Inc.
Detroit

N. FESMIRE, Exec. Engr.
Red Lion-Verree
Philadelphia

E. HORTON, Chf. Engr.
Trico Products Corp.
Buffalo

R. GRAEBNER, PA
Swift All Steel Body Co.
Saginaw, Mich.

H. LEWIS, Treas.
Jubilee Mfg. Co.
Omaha, Nebr.

MRS. F. THOMAS, PA
Crane Carrier Corp.
Tulsa, Okla.

C. CUNNINGHAM, PA
Warner Machine Products Inc.
Muncie, Ind.

R. HOLDER, PA
Reynolds Mfg. Co.
Springfield, Mo.

M. BENNETT, PA
Mitchel & Scott Machine Co.
Indianapolis

F. LIPTORD, Chf. PA
Monroe Auto Equipment
Monroe, Mich.

C. BRESNAHAM, PA
H. Loud Machine Works
Pomona, Calif.

J. MUELLER, Buyer
GMC-Fisher Body Div.
Flint, Mich.

W. PYE, PA
Republic Aviation Corp.
Farmingdale, N. Y.

W. J. HANSEN, Pres.
Moore Body Co.
Reading, Pa.

K. NEWMAN, Genl. Mgr.
D'Velco Corp.
Lawndale, Calif.

P. BERGMANN, Pres.
Johnson Products Inc.
Muskegon, Mich.

M. RULAND, Pres.
Borman Engineering
Culver City, Calif.

J. CANDLER, V. P.
Morse Chain Co.
Detroit

J. SEATON, Genl. Mgr.
B. F. Goodrich Co.
Troy, Ohio

G. STREICHER, V. P.
Monroe Auto Equipment Co.
Monroe, Mich.

HARRY F. KNIESCHE, V. P.
Aircraft Armaments
Cockeysville, Md.

M. COTES, Pres.
Motor Wheel Corp.
Lansing, Mich.

G. TRIMBLE, V. P.
Martin Co.
Baltimore

E. BLACK, Plt. Mgr.
Kentucky Mfg. Co.
Louisville

C. LIGHT, Plt. Mgr.
Rohr Aircraft Corp.
Winder, Ga.

P. SCHMID, Plt. Supt.
Acme Air Appliance
Hackensack, N. J.

J. VANDERGRIFT, Prod. Supt.
United Aircraft Corp.
Broad Brook, Conn.

CLYDE COX, Asst. Supt.
Alma Trailer Co.
Alma, Mich.

LESTER COX, Works Mgr.
Mitchel & Scott Machine Co.
Indianapolis

C. STROBERG, Supt.
Burgess Norton Mfg. Co.
Geneva, Ill.

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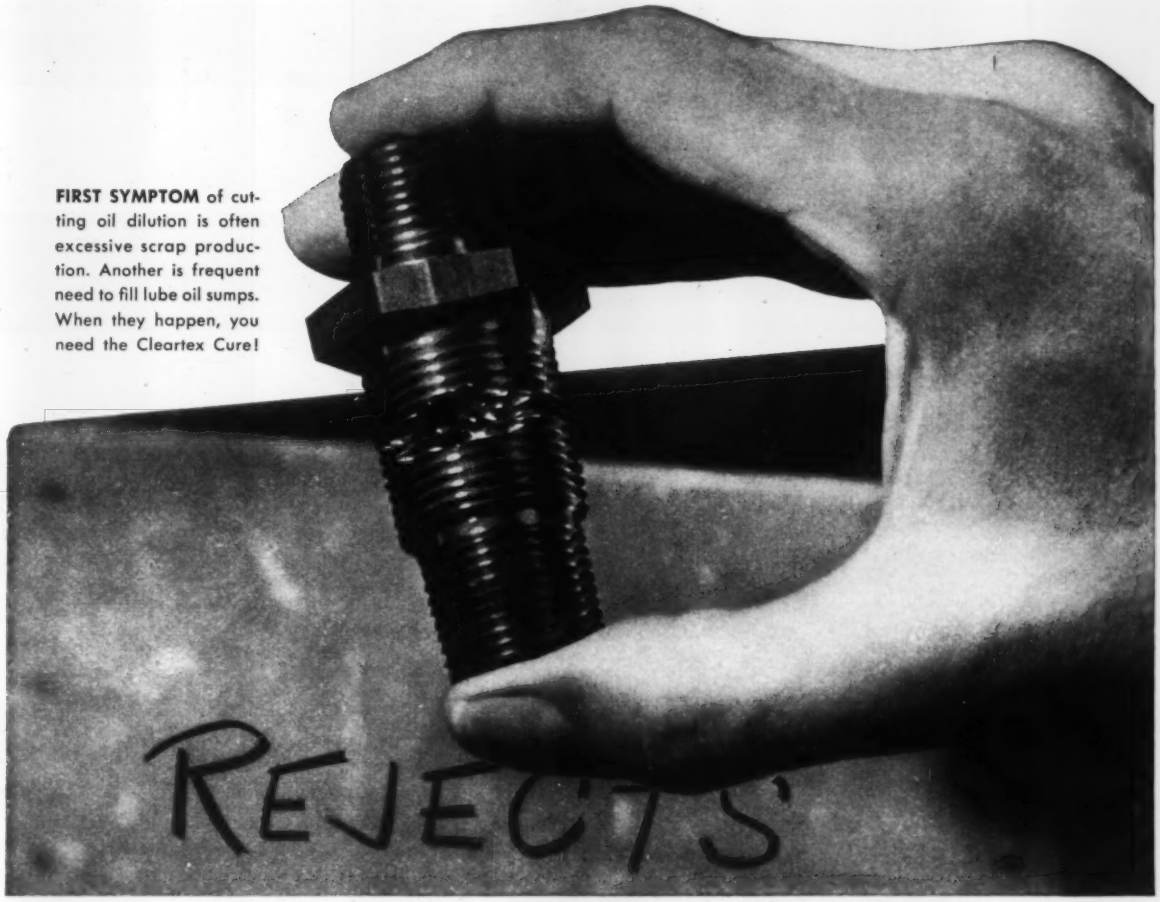

FIRST SYMPTOM of cutting oil dilution is often excessive scrap production. Another is frequent need to fill lube oil sumps. When they happen, you need the Cleartex Cure!

Diluted cutting oil can pile up rejects

When you find your scrap production soaring, the villain may be lube oil leaking into the cutting oil sumps of your automatic screw machines. It happens in 7 out of 10 automatics in spite of the most careful lubricating techniques. This dilution will lower cutting oil effectiveness—and, as it loses its efficiency, rejects pile up, tool life drops, and production can go down by as much as 33 per cent!

Texaco Cleartex can solve the problem—forever!
Because of its exceptional stability and load-carrying ability, Cleartex can function *both* as a cutting oil *and* as a lubricant —and even as a hydraulic fluid. When *all* your automatics' sumps are filled with Cleartex, unavoidable leakage is no longer a problem. Excessive scrap production will stop, tools will last longer and production will go up.

TAKE THE "CLEARTEX CURE" SOON!
Write today for your copy of Texaco's new booklet—"Cleartex in Automatic Screw Machines." This new illustrated guide will fill you in on the details, show you where you may be losing profits and how to avoid it. Or contact your local Texaco Lubrication Engineer for an authoritative survey of your automatics. Just call the nearest of the more than 2,000 Texaco Distributing Plants, or write:

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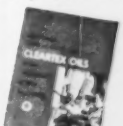
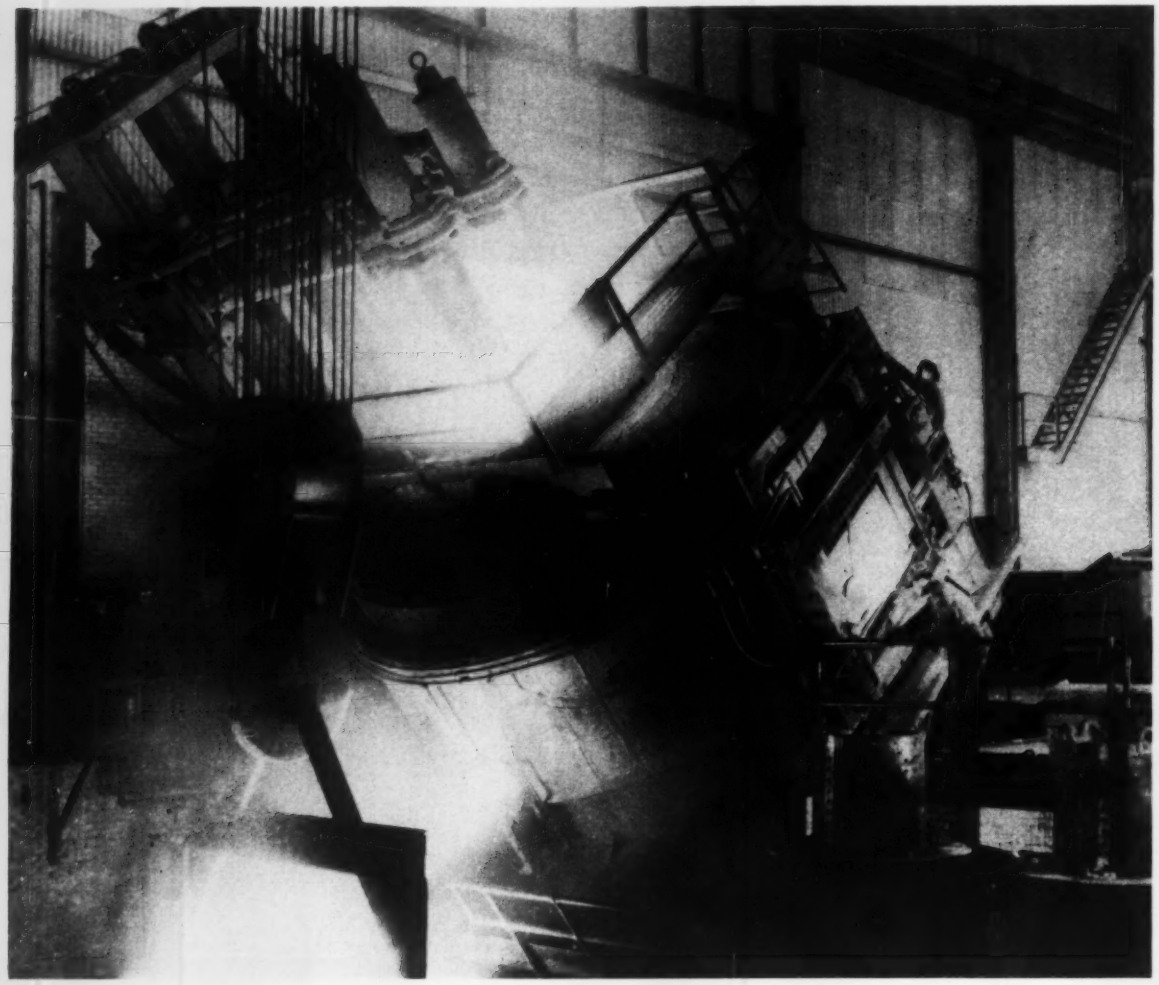


TUNE IN . . . Metropolitan Opera Radio Broadcasts Saturday Afternoons—CBS

LUBRICATION IS A MAJOR FACTOR IN COST CONTROL

(PARTS, INVENTORY, PRODUCTION, DOWNTIME, MAINTENANCE)



Electric Furnaces To Gain In Direct Reduction of Ore

They can be used to supplement blast furnace output or to supply hot metal in small shops; relatively little capital is needed; ore doesn't have to be uniform

REDUCTION of iron ore in the electric furnace or by other direct reduction processes used with it should gain popularity in 1959.

• **Direct Reduction**—There's some difference of opinion about the definition of direct reduction, but many authorities say it's any process other than the blast furnace for obtaining iron from the ore.

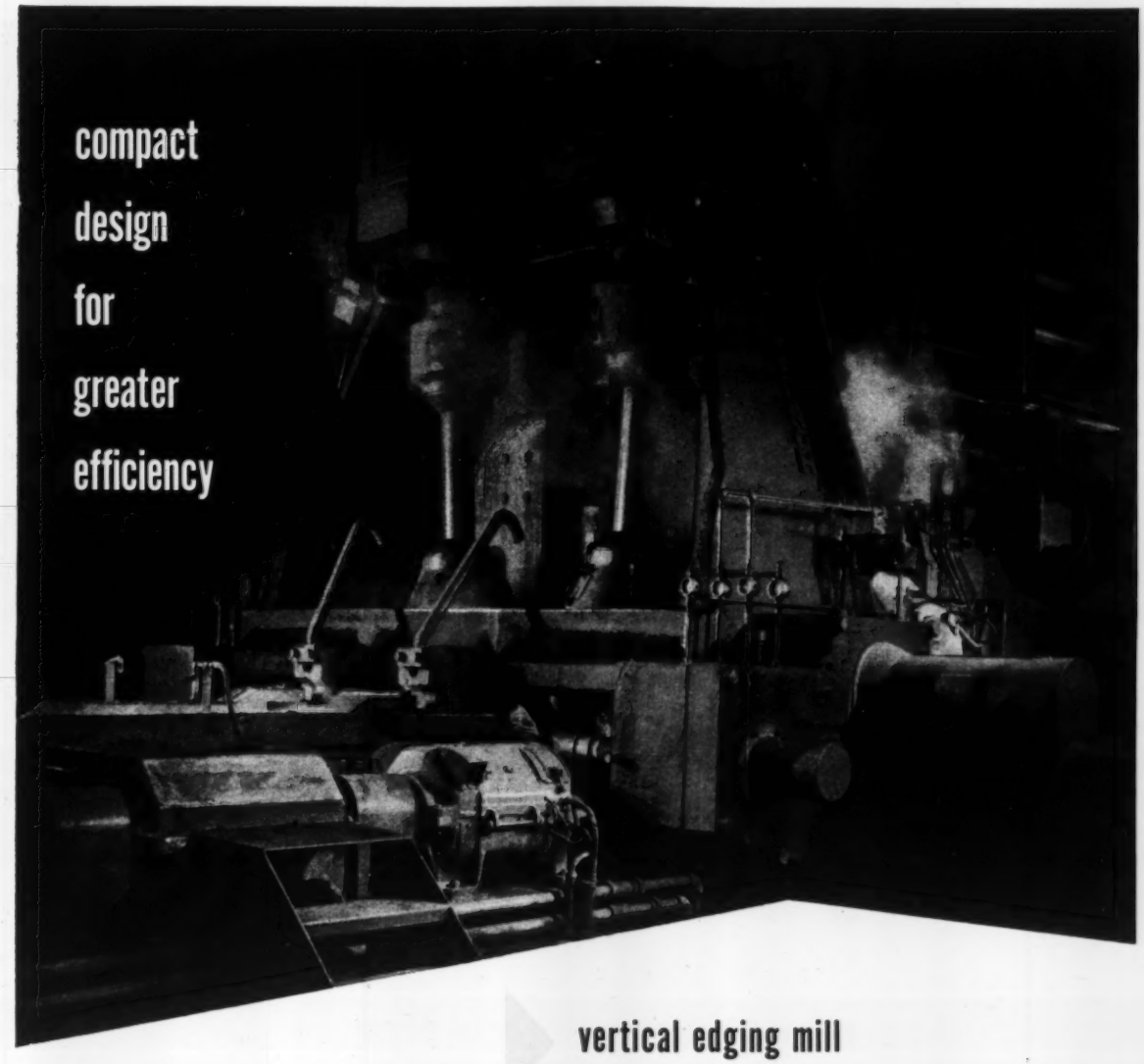
The most important objectives are to produce commercial grades of iron that can compete with cold pig iron and high grade scrap, and to avoid dependence on a supply of high grade coke. Also important: Flexibility as to grade of ore used.

In the last 40 years, several so-called direct reduction processes have been developed. Some promise to rival the blast furnace as iron producers in areas where coal and iron ore quality are low, or where less than 1000 tons of iron are to be produced per day.

Small but efficient reduction plants, built at relatively low cost, would permit electric furnace steel shops to reduce the amount of scrap in the charge when scrap prices are high.

Any of the processes are at their best as suppliers of hot metal, says Harry W. McQuaid, consultant, in Cleveland. He maintains that by charging properly treated hot metal directly into the electric steelmaking furnace, about 400 kw-hr can be saved per ton of hot metal used.

Use of hot metal from a direct reduction process offers savings in



vertical edging mill

The overhead design of this edging mill is the key feature of this typical PITTSBURGH installation. Increased operational efficiency is a natural result of special design.

One giant casting *outlined in yellow in the photograph* was produced by Pittsburgh Steel Foundry Division. Extensive machining facilities are combined with one of the largest steel foundries in the world to produce the finest possible equipment for our customers in the shortest possible time.

We invite your inquiries for primary and auxiliary rolling mill equipment.

"Electric and open hearth steel castings from 1 lb. to 100 tons"

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Let's LAUGH a minute

Of course everyone knows that heat treating today has become one of the most serious technical and vital functions of the current metalworking activity. But a smile and laughter are still also important and the cartoons shown here are for that purpose.

We hope they make you grin and when it's heat treating services you require or skilled, technical advice about part design or heat treatability, check with

METAL TREATING INSTITUTE
271 NORTH AVENUE
NEW ROCHELLE, NEW YORK

or any member listed below.

Sound Familiar?
SABARCASE. THE PRODUCTION MAN SCHEDULES A JOB THROUGH HIS PLANT WITH TIME TO WASTE!
LET'S SEE... PLENTY OF TIME FOR A GOOD JOB ON OPERATION 2... NUMBER 2 SHOULD BE ABLE TO OOZE ALONG NICELY... AMPLE TIME FOR OPERATION NUMBER 3... THEN OUT IT GOES FOR HEAT TREATMENT
PRODUCTION SCHEDULE
BUT... WHEN THE HEAT TREATER GETS IT... IT'S IN AN AWFULLY GREAT HASTE!
SARCASM? NOW'S THAT JOG CRAWLING? TIME'S RUNNING OUT!
FINE, BOSS! I GOT IT TO THE HEAT TREATER 10 MINUTES AGO. I'M CHECKING WITH THEM NOW.
HELLO! ABC HEAT TREATING? WHAT'S NOT THROUGH WITH OUR JOB? DO YOU REALIZE WE HAVE A TIGHT SCHEDULE? TRYING TO MAKE ME LOOK BAD, HUH?.. BLAH, BLAH, BLAH...

Sound Familiar?
CARELESS MILDRED IS NOT PARTICULAR ABOUT THE PARTS HE SENDS IN FOR HEAT TREATING
BUT!.. TAKE A LOOK AT THIS CASTING!
...OFF SIZE, WICKED, CRACKED AND WHAT HAVE YOU. HOW DID IT EVER GET OUT OF THEIR PLANT,...OR DON'T THEY CARE?
Acme Heat Treating Co.
BUT... WHEN HE GETS THEM BACK... WHAM! LOOK WHO GETS THE BLAME!!!
CALL YOURSELVES METAL TREATERS? HAH! YOU SURE GIVE OUR CASTINGS THE 'TREATMENT'! - THEY GO OUT OF HERE 100% PERFECT,... AND WHAT HAPPENS? DO YOU PROP 'EM OFF THE ROOF OR JUST RUN A TANK OVER THEM?.. IF YOU HAVE NO CONSIDERATION FOR A CUSTOMER'S PRODUCT I'LL JUST HAVE TO...

"ARE YOU SURE YOU UNDERSTAND THE PROPER BLAST CLEANING PROCEDURE?"

American Metal Treatment Co.
Elizabeth, New Jersey
Anderson Steel Treating Co.
Detroit, Michigan
Benedict-Miller, Inc.
Lyndhurst, New Jersey
Bennett Heat Treating Co., Inc.
Newark 3, New Jersey
Cook Heat Treating Co. of Texas
Houston 11, Texas
The Dayton Forging & Heat Treating Co.
Dayton 3, Ohio
Deminy Heat Treating Corp.
Dallas, Texas
Fred Heinzelman & Sons
New York 12, New York
Alfred Heller Heat Treating Co.
New York 38, New York
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CANADA
Ipsenlab of Canada Ltd.
Toronto, Ontario

the foundry, too. No fuel would be wasted in cooling and reheating the iron.

Improvements in ore preparation, made in recent years, will benefit users of direct reduction processes. Removal of gangue material before reduction, and mixture of finely divided, concentrated ore with the selected reducing reagent will speed up the refining process.

• **Electric Furnaces**—Greater flexibility is possible in smelting with electric furnaces. They offer efficient operation in large or small capacities. They can be started or stopped quickly, producing faster melts, and close temperature control is possible.

Low capital investment is an important advantage. Fast erection assures faster return of invested capital; and electrics take relatively little space.

No combustion products are present to contaminate the metal bath, and prereduction of ore before it goes into the furnace is said to permit operation on about half the electric current required in European processes.

• **Used in Integrated Plants**—Direct reduction with the electric is an economical way to supplement blast furnace iron at integrated steel plants. In some cases, economic conditions and flexibility of the electric furnace could make it the primary producer of hot metal.

An electric furnace plant, said to be the largest in the Western Hemisphere, was installed in 1958 at Cia Acas Especia Itabira, an integrated steel plant at Acesita, Brazil, by Demag Elektrometallurgie, of Duisburg, Germany. (Lectromelt Div., McGraw-Edison Co., Pittsburgh, is licensed to sell the furnaces in the U. S.)

The plant includes two 17,000 kva covered pig iron furnaces, each having an output of 140 tons a day. Two-furnace operation will provide 8400 tons of iron a month, complementing blast furnace output of 5000 to 6000 tons. Power for the operation is obtained from a 48,000 kw hydroelectric plant at Santa Caravalho.

Another South American installation, to be in operation by 1960, will use electric furnaces to supply hot metal in an integrated plant.

Hot sinter from a rotary kiln is fed into an electric furnace in the Strategic-Udy process. Sinter is deposited around the edges of the reaction zone

An annual ingot capacity of 1.3 million net tons is claimed for the plant. (It's on the Orinoco River near Puerto Ordaz, Venezuela.) Nine, 220 ton electric furnaces will feed hot metal to four, 305 ton open hearths. Current will come from a nearby hydroelectric plant.

• **Competitive Position** — Growing demand for pig iron and hot metal in the steel plant and foundry will make it necessary to expand iron smelting facilities. It isn't likely that blast furnaces will be replaced by electrics, but the high capital investment required, high fuel costs, and relative slowness of the process will cause reluctance to build new stacks.

In the blast furnace, coke of high physical strength is vital, and ore must be uniform for satisfactory operation. When furnace height and diameter are increased, better coke is needed, ore requires more beneficiation, and the furnace burden must be kept more uniform.

Blast furnaces are most practical in large, integrated steel plants. In nonintegrated plants, especially where pig iron must be hauled some distance, smaller iron producing facilities, supplying pig iron or hot metal, are more desirable.

Scrap prices won't be stable with the industry depending heavily on scrap as a charging material. It's a popular opinion that electric furnaces and other flexible reduction processes can produce charge material that's competitive in price and quality with scrap. That should help stabilize scrap prices.

• **Submerged Arc Reduction** — Where transportation and power costs are low, direct reduction in the submerged arc furnace is an economical process. It is popular in Europe and South America.

Deoxidation of molten and superheated iron ore with carbon occurs rapidly if the carbon and iron ore are mixed well and if violent reaction can be permitted. The reaction rate can be regulated by controlling temperature and rate of carbon feed into the active bath.

• **Strategic-Udy Process** — A new method, developed by Strategic Materials Corp., New York, and Koppers Co. Inc., Pittsburgh, the Strategic-Udy Process is said to be economical for smelting iron ore in small or medium sized plants.

Electric power at seven mills per kw-hr, or less, would make the process competitive.

It's a variation of established electric furnace smelting techniques. A rotary kiln prereduces iron ore before it's charged into an electric arc furnace as hot sinter.

Arcs aren't submerged; they're ½

Stack at major Eastern utility: boiler at full load, Buell Dust Collector in operation.

Clear skies ahead

Clear skies ahead on the profit front, too: not only do Buell Dust Collection Systems help public relations and employee morale . . . eight out of ten installations pay for themselves in just a few years!

Expert Buell engineers can analyze *your* dust recovery needs. Decades of experience in field and laboratory and hundreds of installations back up every recommendation. Performance standards are written into every contract.

For more information, send for a copy of the reference booklet, "The Collection and Recovery of Industrial Dusts." Just write to Dept. 26-C, Buell Engineering Company, Inc., 123 William Street, New York 38, N. Y.

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MECHANICAL ELECTRICAL

Experts at delivering Extra Efficiency in
DUST COLLECTION SYSTEMS

in. above to 3 in. below the surface of the molten slag, depending on bath characteristics. Part of the charge material enters the periphery of the furnace; space above the electrodes is open, allowing unrestricted flow of carbon monoxide produced during reduction.

Coal, peat, lignite, or coke can be used as a reducing material. Ores require no special preparation, such as agglomerating, sintering, briquetting, or nodulizing.

Complex ores can be used. Phosphorus, sulfur, copper, nickel, and other elements can be removed selectively.

Carbon content in the reduced product can be well controlled. Pig iron with a carbon content of 3.5 per cent, or semisteel with a carbon content of 1.0 per cent, can be produced directly.

Modest capital investment is required. A 600 ton per day plant, costing as little as $50 per ton of annual capacity, would produce iron at $30 to $50 per ton, depending on power and material costs.

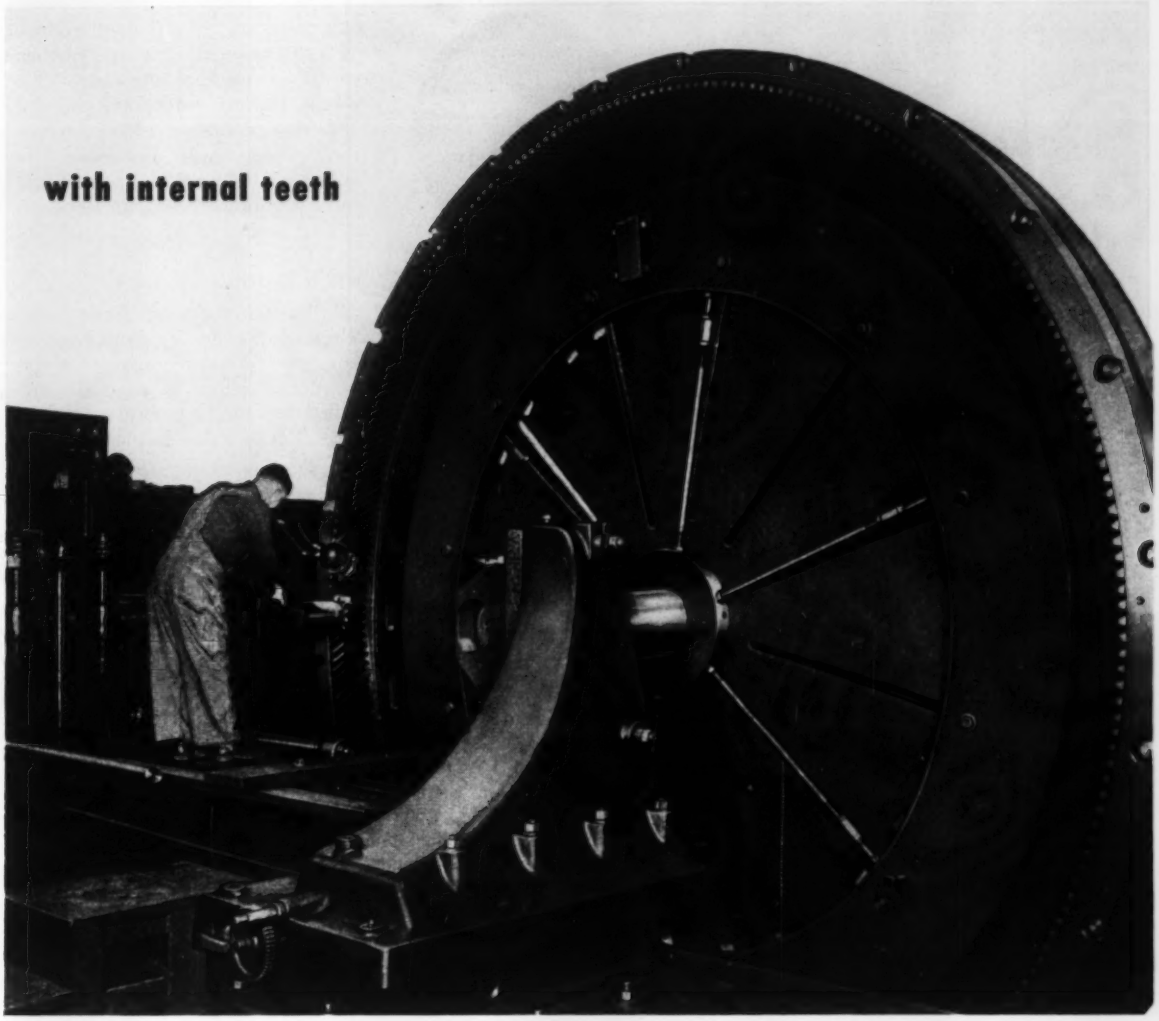
• **In the Works**—Orcarb, a process in development at Swindell-Dressler Corp., Pittsburgh, produces molten pig iron. A mixture of iron ore and coal is pelletized and prereduced in rotary kilns. Pellets are then refined in an electric furnace.

Another direct iron process is being developed by McDowell Co. Inc., Cleveland. Ore is prereduced with coal in a traveling grate system, then charged into an electric furnace, where reduction is completed and molten iron is produced.

• **Other Direct Processes**—Many of the direct reduction processes use a gas to reduce the ore. The Wiberg-Soderfors process, developed in Sweden, uses electricity to make reducing gas from coke. It requires high grade ore and low cost electricity.

The Madaras process uses reformed natural gas to refine high grade lump ore. A small pilot plant is operating in Texas. A similar method, the Hojolata y Lamina process, is producing 200 tons per day in a pilot plant at Monterrey, Mexico. The product: Sponge iron later refined in electric furnaces.

Three other gaseous methods, the H-Iron, Nu-Iron, and Esso-Little processes, reduce high grade ores


with internal teeth

When designs include **GIANT INDUSTRIAL GEARS**

Specify Farrel for accuracy, high quality and fine workmanship.

For 35 years the company's Buffalo plant has specialized in the production of large gears for various industrial uses. Here eight of the world's largest gear generators are kept in regular use. The precision inherent in the operating principle of these Farrel-Sykes machines provides accurate tooth spacing, profile and helix angle.

Farrel internal gears are available with single helical or spur teeth in sizes up to 23′ 0″ external blank diameter, 20″ face, ¾ DP. Farrel's continuous-tooth herringbone gears come in any size up to 23′ 0″ diameter, 60″ face, ¾ DP.

Ask for details of large industrial gears to meet your specific requirements.

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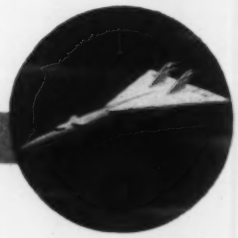
with external teeth

Farrel-Birmingham®

FB-1158



PROGRESS REPORT

Internally-cooled blades and vanes for gas-turbine engines

THE NEED—Present uncooled gas turbines have bumped against the top thermal limits of the metals currently used for turbine components. Only by finding ways to increase the turbine inlet temperatures without affecting temperatures of such parts as turbine blades and vanes can gas-turbine engines of greater thrust and efficiency be made.

THE OBJECTIVE—An investigation was made in the TAPCO Group of Thompson Ramo Wooldridge Inc., to develop a way to produce internally-cooled blades and vanes. By cooling these parts, turbine inlet temperatures can be increased as much as 200°F over present limiting temperatures. This increase should permit much higher thrusts to be developed.

Cooling of turbine components can be achieved either by air or water. Air-cooling seems to be more convenient to apply. For this reason, TAPCO investigations have been directed to the production of blades and vanes with internal air passages.

THE METHODS—Fabrication methods reviewed includes powder metallurgy, casting, rolling, forging, and extrusion. TAPCO established projects on rolling, forging, and extrusion methods.

THE RESULTS—Practical methods have been developed at the TAPCO Group for drilling holes economically in such alloys as Udimet 500, Waspalloy and other blade materials.

Extrusion of pierced preforms has been accomplished by the TAPCO Group.

TAPCO engineers and metallurgists have developed practical methods of rolling pierced preforms to produce blades of accurate finished size and contour while maintaining the integrity of internal air passages during forming operations.

Both tapered and straight air passages have been achieved by methods and equipment suitable for mass production of air-cooled blades.

Limitations on the commercially feasible rolling of air-cooled blades and vanes have been established after considerable research on several rolling methods.

TO SUM UP—The TAPCO Group of Thompson Ramo Wooldridge Inc. is able to produce air-cooled blades and vanes from materials currently available to meet the requirements of gas-turbine manufacturers for higher turbine inlet temperatures. When may a TAPCO engineer call to give you complete information and design data?

TRW

TAPCO GROUP

Thompson Ramo Wooldridge Inc.

Dept. ST-359 • Cleveland 17, Ohio

with reformed natural gas, producing cold briquets that are further refined in electric furnaces. The H-Iron process was developed by Hydrocarbon Research Inc.; the Nu-Iron process was developed by United States Steel Corp.; and the Esso-Little process by Esso Research & Engineering Co., Standard Oil Co. (New Jersey) affiliate, and Arthur D. Little Co. Inc.

Still another gaseous process, developed in Sweden by Stora Kopperberg, uses carbon monoxide and hydrogen to refine high grade ore. Called the Stelling process, it produces 200 lb a day in a pilot plant.

A number of methods use some form of carbon as a reducing agent. They're known as kiln processes. One, the Hoganas process, reduces high grade ore, using coke. It produces sponge iron in blocks or cakes.

The Krupp-Renn process, developed in Germany, was used there and in Japan during World War II. Coke and powdered coal are used to reduce special ore that has a definite alumina-silica ratio. Iron produced is high in sulfur and phosphorus; only a few Krupp-Renn plants are in operation.

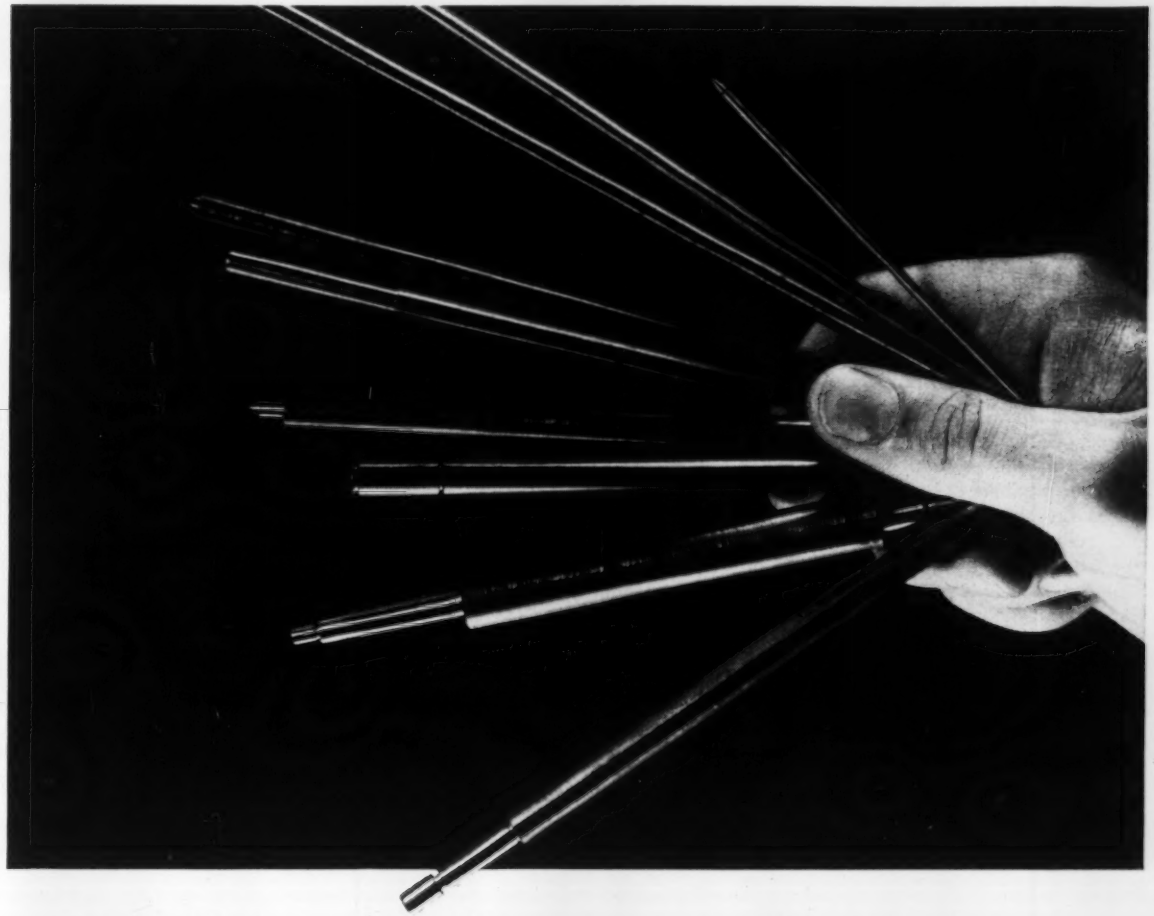
The National-Titan process, developed in Norway, is useful in refining titaniferous ores. It reduces iron and titanium oxides at the same time, using carbon as a reducing agent, in a rotary kiln.

A method developed jointly by Republic Steel Corp. and National Lead Co. called the R-N process, reduces ore of almost any grade and produces briquets that take further refining. Coal and lime are used as reducing agents. Another kiln process, developed by National-U. S. Radiator Corp., Johnstown, Pa., produces powdered iron.

Another method, called the Madrigal process, makes briquets for use in gas, induction, or arc furnaces. Ore must be ground fine and beneficiated. A pilot plant will go into operation soon in California.

The Cyclo Steel process produces molten pig iron, using fine, high grade ore, coal, and oxygen as raw materials. A similar method, the Ford-Oster process, is said to produce hot metal from any grade ore.

The Armco process, operating on the fluidized bed principle, produces powdered metal that's further refined in an electric furnace.



Which will inspect these shafts faster... mechanical or optical gaging?

Over 25 different metal shafts go into the calculators made by Monroe Calculating Machine Company.

In the past, inspection of these shafts required the use of a large number of "go" and "no-go" gages. Rate? *About 7 per minute.* In addition, gage surveillance was both time-consuming and expensive.

Then the switch was made to optical gaging, using a Kodak Contour Projector. The method is simple: A master shaft is positioned to either upper or lower tolerance limits on the screen. Then the part to be inspected is placed in the same position.

Rate with optical gaging? *About 17 per minute!* And, there's no longer a need to send gages back to the crib for resetting. One Kodak Contour Projector does the whole job.

Besides saving time, optical gaging with a Kodak Contour Projector offers you a chance to *cut* down on gage costs, use operators with little or no training, and often obtain accuracy *not* possible by other means.

Where can you use optical gaging? Almost *anywhere* in the plant—receiving, assembly, production, final inspection, toolroom.

Facts about Kodak Contour Projectors are spelled out in a brochure which you can get by writing to the address below. After you've had a chance to look over the contents of the book, we'd like to demonstrate *why* and *how* one of the six Kodak models will best fit your inspection needs.

Use of low-cost Model 8 Kodak Contour Projectors enabled the Monroe Calculating Machine Co., a division of Litton Industries, to more than double inspection rates.

Special Products Sales

EASTMAN KODAK COMPANY, Rochester 4, N. Y.

the KODAK CONTOUR PROJECTOR

Kodak
TRADE MARK

Builder Doesn't Believe In Mousetrap Theory

MANAGEMENT at Kearney & Trecker Corp., Milwaukee, doesn't believe in the better mousetrap theory of marketing. So it has embarked on an aggressive campaign to introduce a new machine: The tape controlled, automatic tool-changing Milwaukee-Matic (STEEL, Mar. 9, p. 83).

The basic idea behind the campaign: The Milwaukee-Matic is more than a new machine. It's a new production system.

• **Self-Analyzer**—K&T officials are so convinced that their machine can earn its own way that they have come up with a booklet that will enable you make your own analysis of it.

Understandably, the booklet is slanted slightly in the direction of this type machine, but it's loaded with information. It's a kind of guided tour through some steps that ought to be part of every manager's evaluation of his need (or lack of it) for a new piece of equipment.

• **Point One**—The first step is to figure out whether more money should be poured into the systems and equipment you're now using, or into a different system.

To help you get the answer, the booklet tells you to consider: Capital investment in machines, tools, handling equipment; machine utilization—measured as the percentage of available machine time that metal is being cut; inventory—which can be cut if your equipment is highly versatile and can be set up and cycled in a hurry; floor space and its cost leadtime; machine management and the advantages of controlling the machine from the engineering department (via tape); and flexibility.

• **Point Two**—After you have read the short course in system evaluation, there's a brief lesson in evaluating the Milwaukee-Matic for your machining jobs. This section suggests parts that are naturals for the machine, and it tells you how to select a sample group of parts step by step, estimate the production time, determine yearly savings, and figure the time it will take to get your investment back.

• **Aim**—K&T managers are saying: We figure the machine has a sufficient potential to justify itself in a wide variety of production shops. We're so convinced of it that we figure some prospective customers can make their own armchair study and conclude that they can use, and quickly pay for, the tape controlled, automatic tool-changing machine.

With this approach, K&T hopes to get a path beaten to its door.

Sales Outlook Brightens

After being in nearly a dead calm during most of 1958, machine tool business has picked up a breeze of orders. Most builders are smiling again when they talk about the sales outlook. It's pretty much the consensus that 1959 is going to continue to get better.

So far, the recovery has been made with only a minimum support from the industry's largest single customer, the automakers—they continue to rebuild when they need a machine.

Any increase in ordering of automotive-type machines could give the machine tool industry the shot in the arm that will make 1959 a good year.

Electronic System Governs Heat Treat

AN ELECTRONIC system for controlling time and temperature in heat treating furnaces may be the quality control tool you're looking for to cut costs, turn out better work, and meet the tight tolerances demanded by specifications.

The system was developed in the research laboratories of A. F. Holden Co., Detroit, which terms it "rationed heat energy." Instrumentation is built around an electronic timer that can be set at predetermined points for time and temperature through two phases of heat treating.

• **Fuel Savings**—In a recent test, a 133 lb, cylindrical, steel billet was heated in a luminous wall, gas-fired furnace equipped with rationed heat energy controls. Fuel cost savings during the 3-hour heating cycle amounted to more than 16 per cent.

Other advantages pointed out by Holden engineers are a finer degree of equilibrium in heating, greater uniformity of heat penetration, minimizing of work distortion.

Once the preset time and temperature controls have been fixed electronically and the furnace started, they cannot be changed or tampered with.

• **Typical Program**—If the first phase is set at 1000° F for 20 minutes and the second phase at 1300° F for 20 minutes, the entire 40 minute cycle (with automatic stepup to the 1300° F level at the end of the first period), will be completed without interruption and without deviation from the fixed time and temperature settings.

A rationed heat energy system becomes particularly important when a furnace is zoned to handle several time cycles and temperature levels for heat treating a part of varying dimensions and thicknesses, such as a guided missile shell, that might easily range from 0.110 to 1¼ in. in thickness.

With proper modifications of piping and wiring, the instrumentation and controls can be adapted to any conventional heat treating furnace, gas-fired or electric, says Holden.

Introducing Allied's

IRILAC™ #1000

New Clear Protective Coating for All Metals . . . as safe and easy to handle as Water!

New method of protection incorporates corrosion inhibitors in a water-soluble polymer base. Dries to an extremely thin, tough, durable coating—clear in color. Does not chemically affect base metal or any post-treatments. Used as a protective treatment alone or to enhance value of post-treatments.

Allied's new Irilac #1000 is a concentrated solution of a water-soluble polymer with built-in complex corrosion inhibiting materials. It was developed to answer the needs of the metalworking industry for a non-conversion process that will provide corrosion resistance and resistance to fingerprinting and abrasion on base metals and electrochemically or chemically finished surfaces—without changing the appearance of the metallic surface.

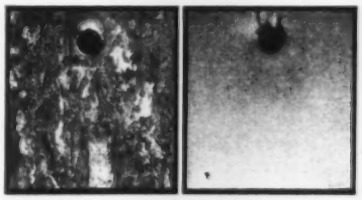
There are no hazards involved—Irilac is non-fuming, non-toxic, and requires no special fire prevention measures.

THE PROCESS

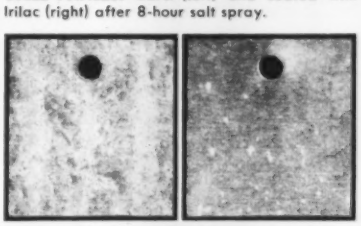
Irilac #1000 is diluted with water to provide a simple one-pass working solution. It is then applied by dip, brush or spray and forms a coating that quickly *bonds* to the metal surface without reacting with the surface.

THE PROPERTIES

The resulting coating is clear, transparent, thin yet durable. It has excellent water-resistant properties, and can be rubbed, handled and subjected to rough treatment. The surface to which Irilac has been applied is not altered—in fact, the transparent coating brings full tone to colored surfaces and clarity to iridescent surfaces. The water-thin physical characteristic of the solution means that the coating provides protection in recessed areas that are difficult, if not impossible, to protect with other methods.



STEEL PANELS: bare (left) and coated with Irilac (right) after 8-hour salt spray.



ALUMINUM PANELS: bare (left) and coated with Irilac (right) after 168-hour salt spray.

WHERE IRILAC CAN BE USED

Irilac #1000 can be applied to *any* metal—wet or dry—treated or untreated. All metals can be processed in *one* operation in the same solution. It can be applied in conjunction with any process—over Iridite, anodized, phosphated surfaces, black oxide, etc. Surfaces treated with Irilac provide a good base for paint.

APPLICATION ADVANTAGES

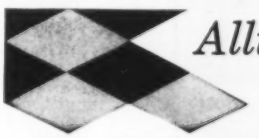
No other process or material available for the protection of metals offers all the application advantages found in new Irilac #1000:

1. It can be applied to *any* clean metal simply by dip, brush or spray. No special equipment is required.
2. Saves time—just apply and dry—no reaction time required.
3. No hazards involved—no exhaust or special fire protection equipment is required. Irilac is non-fuming and non-toxic.
4. Saves space. Presents no disposal problem. Low in first and final costs.

Because of its versatility and complete safety, Irilac has unlimited uses. For example, it will protect aluminum furniture, brass hardware and fixtures, steel parts of all types, zinc castings, etc. In fact, any base metal or plated surface, or those treated with electrolytic or chemical post-treatments, can be improved or enhanced with Irilac.

IRILAC #1000 MAY BE THE ANSWER TO YOUR PROTECTION PROBLEM

Our development staff will be glad to work with you to determine the significant benefits Irilac can offer you. Simply send us some parts and let us show you what Irilac can do. No obligation, of course.



Allied Research Products, Inc.

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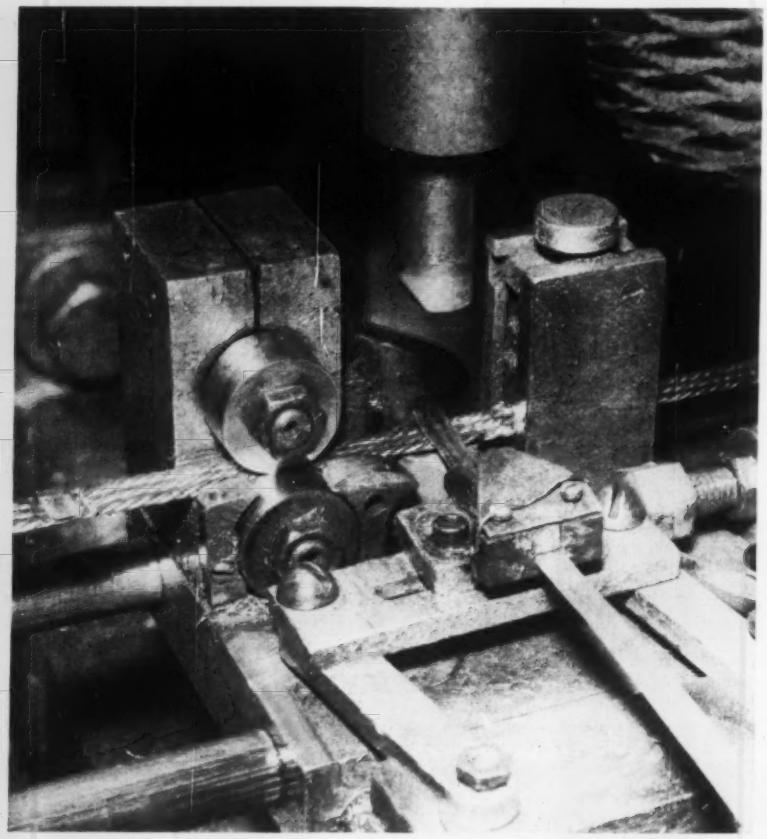


Ribbon of brazing alloy is bonded to firmly clamped cables. Rotary shear at left trims ribbon. Cutoff shear (not shown) then makes cut through center of bonded section as it passes to next position

Stranded Cable Brazed, Cut Automatically

Spotwelder with special equipment solves fraying problem in making shunts for circuit breakers. Standardized parts and automated line trim over-all costs

By W. SCOTT and J. L. HARPER
Section Manager Materials Engineer
Westinghouse Electric Corp.
Sharon, Pa.

OTHER PRODUCTION operations can be facilitated if you use the right welding equipment and standardize components. Also, the quality and appearance of your product will be improved.

A new machine, designed and built at the Sharon (Pa.) transformer plant of Westinghouse Electric Corp., brazes round, stranded copper cables to prevent fraying, then cuts them into specified lengths.

In a typical operation, brazing and cutting three-cable shunts, 3¼ in. long, the machine turns out 1800 pieces an hour.

• **Round Cable Preferred** — Small circuit breakers, in a number of ratings, require many connecting shunts. Fine stranded wire is used to insure flexibility. Cross-sectional area varies in proportion to the anticipated electrical load.

Several sizes must be stocked if flat, braided cable is used. Westinghouse found that it could reduce inventories by using round, stranded cable in two sizes. Only the completed one, two, and three cable shunts are stocked. Where greater cross section is needed, those can be stacked in assembly. Raw material costs are lower, too; round cable of a given current carrying capacity costs less than the flat.

• **Fraying a Problem**—Soft solder will prevent fraying when cable lengths are cut, but this operation hikes over-all costs, and solder interferes with subsequent brazing. Appearance is bad and time is wasted in assembly, dressing the ends, if there's no initial protection.

• **Spotwelder Modified** — Attachment of terminals or other current carrying members is an operation apart from making of shunts. Terminals must be installed one at a time. Automatic equipment and standardization have resulted in shuntmaking being confined to six basic units.

Equipment is built around a standard spotwelder. A standard electrode is cut to within ⅛ in. of the water chamber, and a molybdenum tip, contoured to fit the cable, is brazed on. Cavity depth is slightly less than the finished cable radius; width is equal to finished cable diameter. The cavity is smaller than original cable diameter, so that strands are compressed during brazing. That prevents arcing at the electrodes.

For multiple cable shunts, the top electrode is flat; only the bottom one is contoured. Edges are well rounded, and the ends flared, so that no notch lines will develop in the cable.

• **Precision Results**—Like any brazing operation with a controlled

time cycle, the system requires constant contact area and welding resistance. Electrode contact area is controlled by machining as wear or cracking occurs. Cable being brazed is fed steadily and kept in the same relative position.

Slotted brass guide blocks, with Micarta inserts, are adjustable to accommodate several or single strands.

Some clearance is provided, but the cable isn't allowed to wander or cross over.

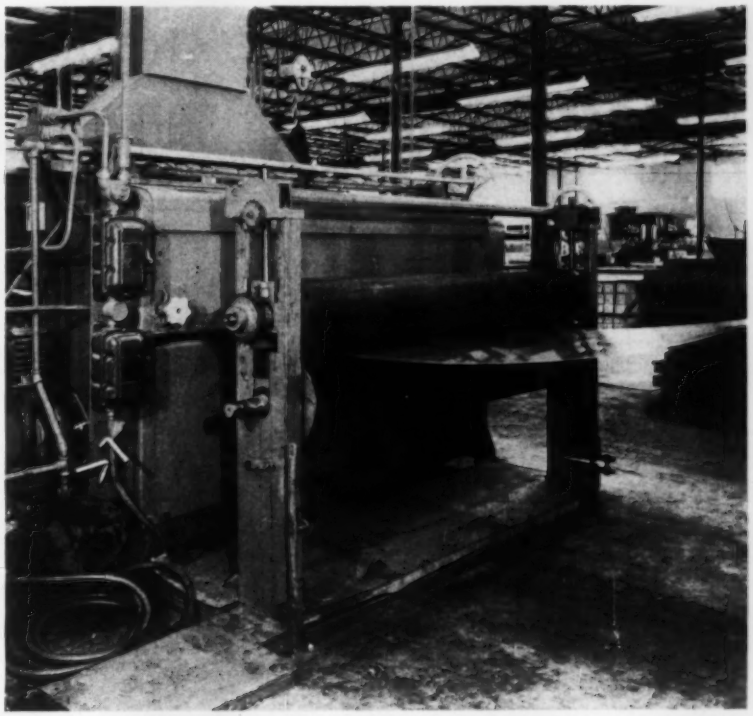
The brazing agent (a continuous ribbon of 5-mil Sil Fos, 1/4 in. wide) is fed across the cables as the electrodes open and close automatically. Initially, only enough heat is applied for compacting and bonding.

Part of the brazing agent is left unfused. It's used later as a joining medium when shunts are brazed to terminals.

• **Cut to Length**—When the ribbon has been bonded, electrodes separate and the cable moves through rotary knives that cut off the brazing agent, leaving only enough to cover the width of the cable. The cable then passes through the jaws of a small clamp and shear. When the clamp is open, cable moves freely; when it closes, it holds the cable firmly. The shunt is cut to the right length; the brazing agent is split, so that half remains on each of the cable ends. While the clamp is closed, an air cylinder moves the clamp and shear head, pulling the cable into position for the next cycle.

• **These Didn't Work** — Earlier, work with stranded cable emphasized reduced handling time. One method: Braze terminals to the cable, then cut the cable to the right length. Where separations were needed, two terminals were placed close together on the cable. Space left between terminals made too much loose cable after cutting.

Also tried: Two terminals were placed on the cable, and both brazes were made at once. The operation was suited to fixturing. That increased uniformity and minimized hand operations. But complex parts and mounting requirements often made it difficult to place the two terminals close together. Also, one set of fixtures lacked the flexibility to produce the large number and variety of shunts.



The open slot is the only opening on the infeed side of this hooded adhesive spreader. The rolls position the sheet aluminum for feeding

Adhesive Problem Licked

Controlled solvent evaporation maintains workability in applying problem materials to sheets prior to lamination. Spreaders can be equipped with hoods or solvent drippers

IF YOU apply contact adhesives, here's a way to increase your production.

Solvents evaporate in mechanical spreaders. The adhesive spiderwebs and becomes unworkable.

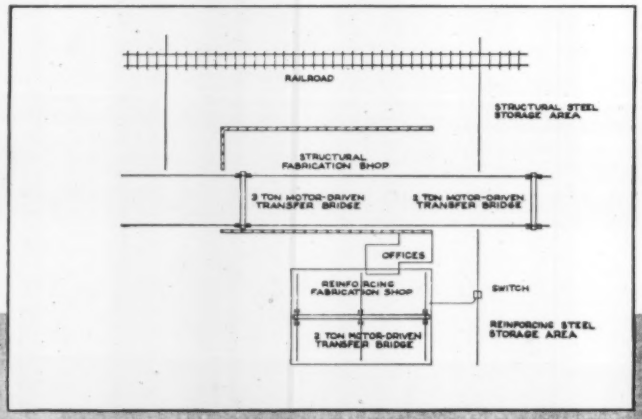
To allow handling of such glues by a faster and more satisfactory method, Black Bros. Corp., Mendota, Ill., manufacturer of adhesive spreaders, developed units that keep the adhesive workable. The company found that hooding the spreader would retard solvent evaporation.

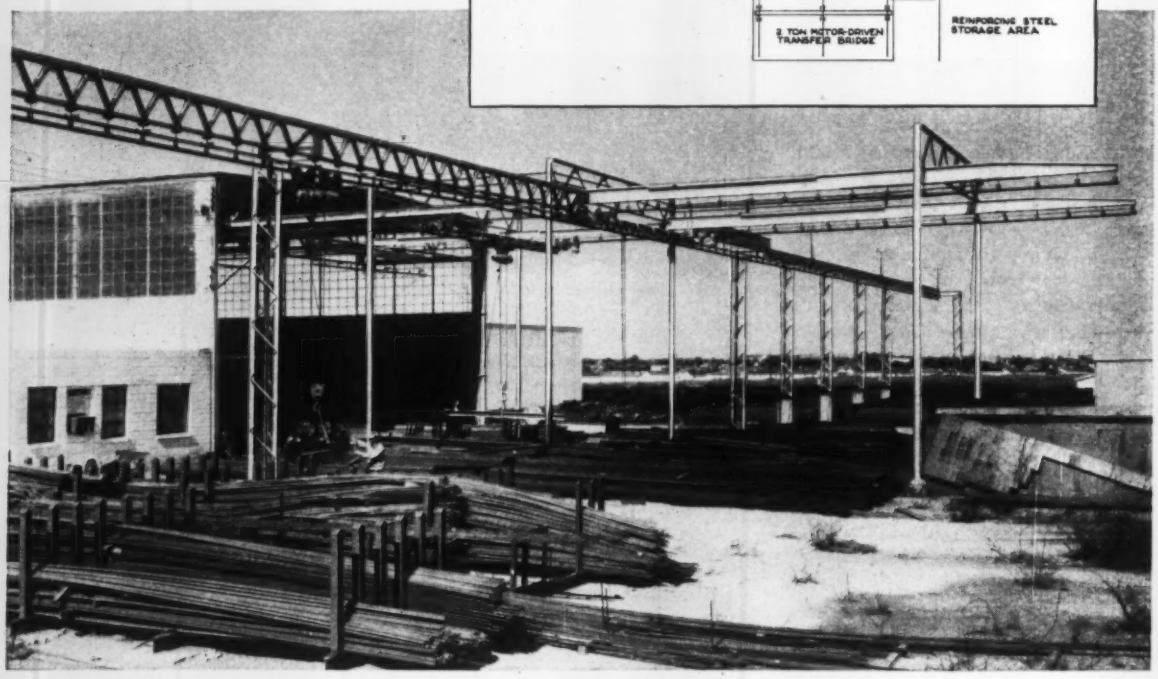
In some cases, a solvent dripper is installed to replace solvent as it evaporates from the adhesive.

• **Application** — Panelfab Products Inc., North Miami, Fla., uses one of the hooded units at its Hialeah, Fla., plant. Coiled aluminum sheet is coated with adhesive prior to lamination with sheet plastic films. The aluminum is fed into the hooded spreader at 10 to 60 fpm. After emerging, the coating is made tacky, heated, and the aluminum sheet is laminated with plastic fed from a continuous roll. The laminated stock is coiled at the end of the line.

"Inside-outside" Tramrail System
BOOSTS STRUCTURAL SHOP PRODUCTION 66%

Although Thornton Steel Co. is an important steel fabricator and could readily make equipment to handle its materials, it has installed Cleveland Tramrail throughout its yard and plant because it recognizes the importance and advantages of materials handling equipment especially designed and built for the purpose.





MAN-HOURS required for fabrication of trusses and various steel work for buildings were cut an average of 40% with a Cleveland Tramrail system by Thornton Steel Co., Fort Worth, Texas.

Thus, without expanding the plant structure, or adding to fabricating machinery or working force, production was stepped up 66%.

Being situated in a part of Texas where winters are not severe, much of the work is carried on out-of-doors. Tramrail transfer cranes and carriers serve both inside and outside the plant. This enables delivering materials from various parts of the yard to any part of the shop without rehandling. Thus materials are moved fast and efficiently in the least possible time.

WRITE FOR FREE COPY of Engineering and Data Booklet No. 2008. Packed with valuable information. Profusely illustrated.

CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

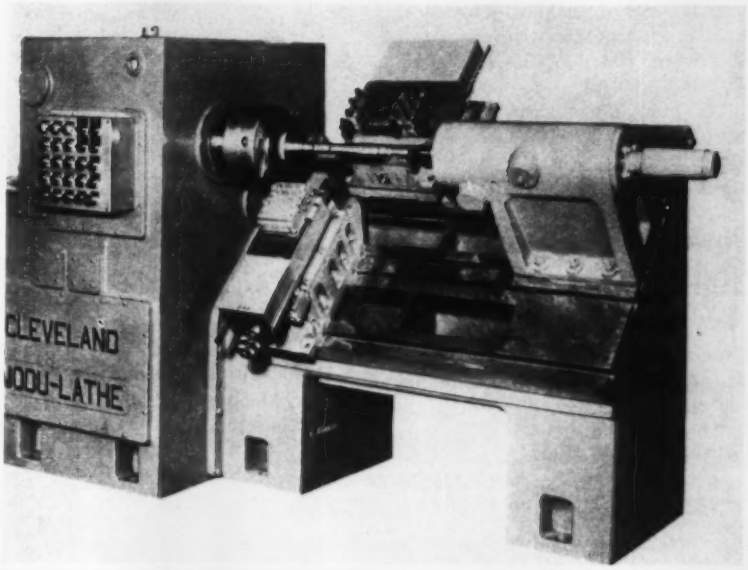
CLEVELAND TRAMRAIL DIVISION • THE CLEVELAND CRANE & ENGINEERING CO. • 7826 E. 290 ST. • WICKLIFFE, OHIO

Modular Machines Won't Become Obsolete

THE MODULAR construction of the Cleveland line of lathes, automatics, and chucking machines allows the purchaser to buy only for immediate needs. He can add or change components to meet later requirements.

Many interchangeable machine parts can be used with any one of the six heavy-duty headstocks and four rigid beds. Speeds up to 5000 rpm are available with the headstocks. Machine beds vary from a 30 in. pedestal type to a 140 in. unit.

Interchangeable components include single-compound and rocking cross slides; profiling and back-off profiling slides; indexing tool and boring tool posts; turrets; flat and round template positioners; spindle indexing mechanisms; tracing controls; hydraulic tailstocks; multipass recycle controls; high speed collet assemblies; two and three roller hydraulic follower rests and steady rests; bar feeders; thread rolling, knurling, and lettering attachments; motorized attachments; and others.



The capitalization cost of the base machine is extremely low, says the builder, because the components in many models are considered as tooling with advantages in depreciation.

For more information, *write* Cleveland Hobbing & Machine Co., a division of Textron Inc., 1311 Chardon Rd., Cleveland 17, Ohio.

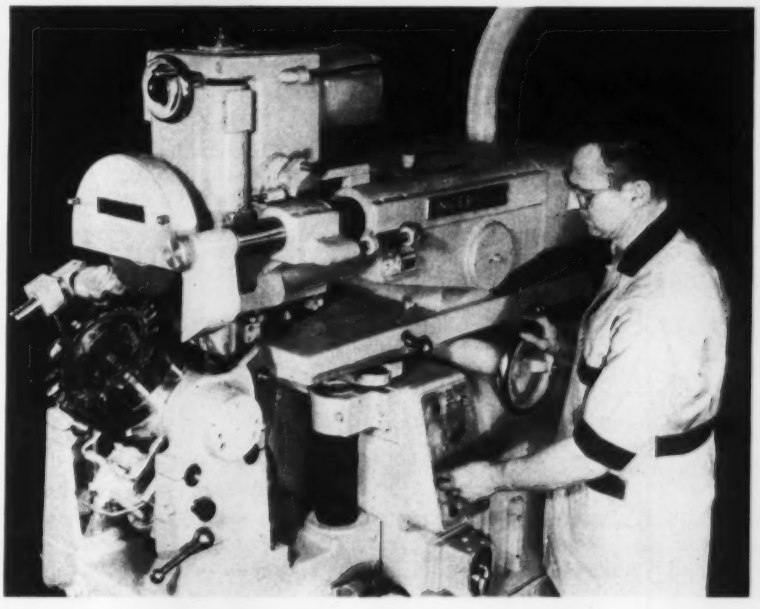
Milling Cutter Grinder Lengthens Tool Life

LABOR SAVINGS in the grinding-room and increased production in the machine shop are twin objectives of the Ingersoll automatic cutter grinder.

An operator can run more than one of the automatic grinders, thus reducing toolroom labor costs. Better grinds resulting from mechanical control of the grinding action will lengthen cutter life and improve accuracy and finishes, which means getting more work from large tools.

The machine was designed for grinding a variety of inserted blade carbide cutters used in general purpose, job shop milling. Setups are easily and rapidly changed from one size and type of cutter to another.

It will do a complete sharpening job on a wide range of milling cutters since it will grind on the outside diameter as well as the face



and bevel of any cutter within its 4 to 20 in. diameter capacity. It spin-grinds newly filled cutters to size.

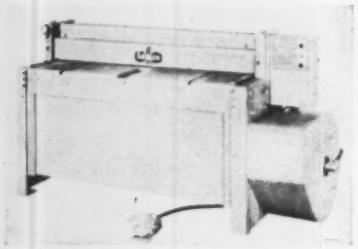
As the grinding wheel wears, the spindle speed automatically increases to maintain a constant surface speed. The wheel is automatically dressed with every stroke.

For more information, *write* Ingersoll Milling Machine Co., Rockford, Ill.

Power Shears Operate at 300 Strokes a Minute

OPERATING at a speed of 300 strokes a minute, four new shears provide cleaner cuts with less humping than their slower counterparts.

They will shear 16 gage mild steel, 18 gage stainless, and heavier gages of aluminum in widths of 36, 42, 52, and 72 in.



Heavy duty steel side members support the shear rigidly. An all-steel reinforced knife frame does away with work spoiling deflection. Four-edged, alloy steel shear knives give four times the cutting life of single-edged knives.

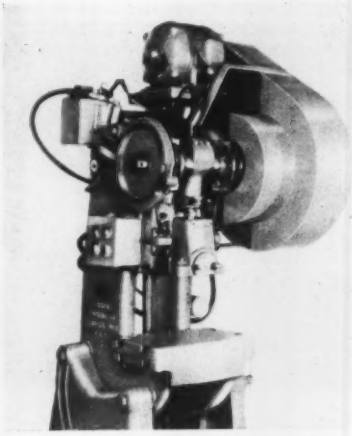
For more information, *write* Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis.

Pneumatic Clutch, Brake New in Power Press Line

THE CLUTCH and brake in this line of presses provide rated capacity at less (up to 40 per cent) cost than other types of air clutches, says the manufacturer.

It is a high torque, low inertia unit. Self-compensating for wear, it never requires adjustment.

The air brake enables you to do continuous stroking without fear of



overheating. The clutch disengagement point (and brake engagement) in the stroke is adjustable to provide for varying requirements and die weights.

For more information, *write* Famco Machine Co., 3100 Sheridan Rd., Kenosha, Wis.

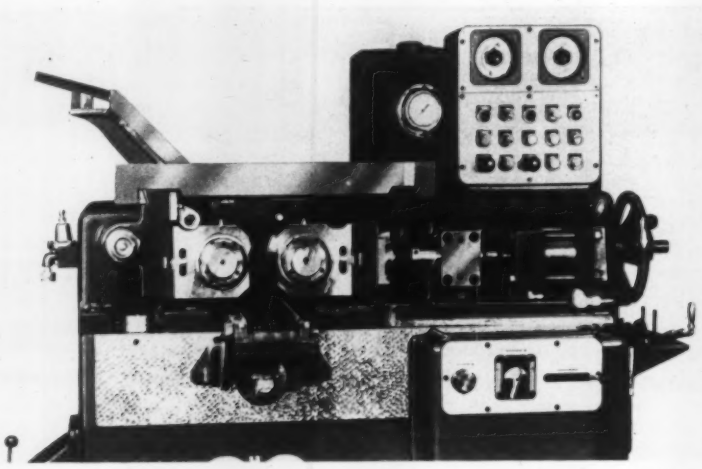
Automatic Unit Solves Count Control Problems

WITH the Countron, you can control sequential operations of high speed machinery, packaging and batching of parts, cutting of stock to exact lengths, and similar operations.

The predetermined counter can be actuated by photoelectric controls, electromagnetic transducers, contact type flow meters, and any type single pole, single throw switching device.

Operating at counting speeds up to 1000 ipm, the device can be used to actuate control motors, solenoids and relays, conveyors, choppers, shears, valves, kickers, markers, and other types of equipment.

For more information, *write* Hobson Miller Machinery Corp., 280 Lafayette St., New York 12, N. Y.



Machine Thread Rolls Double End Studs

THIS Lanhyrol thread rolling machine handles double end studs up to 13½ in. long. Through extended spindles, it will produce ⅜ to 9/16 in. diameter threads at a rate of 102 a minute, and ⅝ in. diameter threads at 80 per minute.

Threads are rolled continuously. Parts are fed automatically into the machine from an inclined magazine. They are carried into rolling position by an indexing workrest "cage." Two parts are rolled during one die revolution. Threaded studs drop into a conveyor and are carried out the front of the machine.

Two rolling methods are available. The fastest is by segmental or cam periphery dies with mechanical indexing for parts up to ⅝ in. diameter on either single

In this 48 page handbook you'll find useful engineering and fabricating data including practical examples showing where, when and how Van Huffel Roller Die, Cold Formed Metal Shapes simplify design, increase production and reduce costs. It includes information on material selection, machine operations on shapes, fabrication methods, tolerances for roll forming, and dozens of interesting illustrated ideas that have taken shape in metal.

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VAN HUFFEL TUBE CORPORATION
Warren, Ohio

Please send a copy of your Metal Shape Handbook

Name and Title.....

Company.....

Address.....

City..... **State**.....

or double end work, and for ¾ in., single end only. In this range, left and right hand, large and small diameters, or identical threads may be rolled.

The second method is used for work larger than ¾ in. on one end only. Plain cylindrical infeed dies are used with automatic infeed cycle, and electropneumatic indexing is substituted for mechanical indexing.

For more information, *write* Landis Machine Co., Church and Fifth Streets, Waynesboro, Pa.

Electric Fork Trucks Can Work in Trailers

THREE new battery powered, low silhouette, fork lift trucks are capable of double stacking freight in trucktrailers. They have a seat

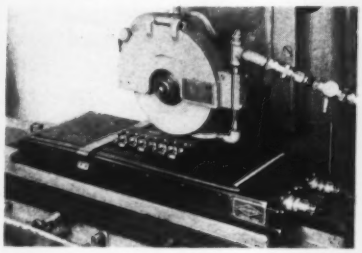
height of 34 in. and an over-all height of 71 in. to the top of the overhead guard.

The low silhouette, combined with Clark's carbon pile drive control which provides stepless acceleration, gives the trucks the compactness and mobility needed to drive in and out of trailers with capacity loads.

Called the ECLS Series, the trucks are available in capacities of 2000, 3000, and 4000 lb. For more information, *write* Industrial Truck Div., Clark Equipment Co., Battle Creek, Mich.

Electrostatic Chucks Hold Metals, Some Nonmetals

BECAUSE it uses electrostatic rather than electromagnetic force, the Electroforce chuck will hold aluminum, copper, and brass, as well as ferrous metals (including stainless steel).

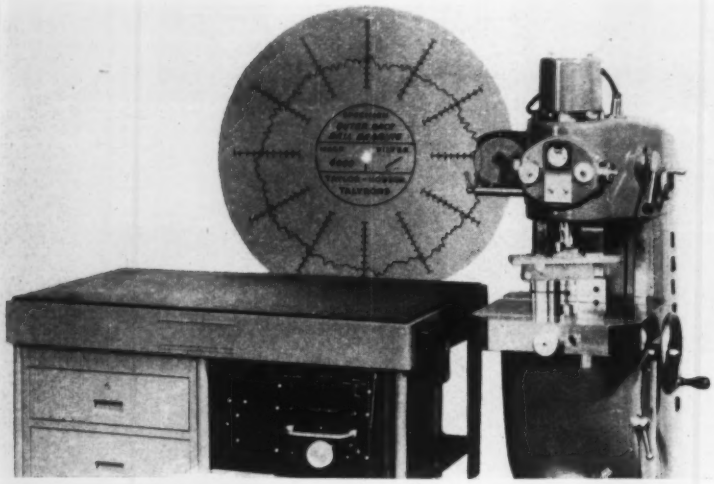


Any electrical conductor can be chucked with equal efficiency. It is also possible to hold ceramics or plastics if they are first flashed on the holding surface with a metallic coating as thin as 5 millionths of an inch.

Basic units in the chucking system consist of the chuck, a compact power supply, the Dribox (which keeps the work moisture-free at slightly above room temperature), and the coolant pump and filter unit required to furnish a supply of clean dielectric coolant.

Work is instantly gripped and released by a simple control switch. There is no residual magnetism with the system, even when used with ferrous metals.

For more information, *write* Electroforce Inc., Fairfield, Conn.



Machines Check Roundness, Squareness

ACCURACIES of 0.000002 in. on parts up to 12 in. OD or ID and heights up to 10 in. are possible with the Model 50 roundness measuring machine. With simple accessories, squareness and concentricity also can be checked.

The arrangement of operating controls and streamlined design make the instrument suitable for individual or production inspection.

The spindle is built into an assembly containing the drive and true co-ordinate, straight line, inkless polar recorder. Work in any convenient fixture can be located on the elevating table.

For more information, *write* Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill.

Motor Line Rerated

TOTALLY enclosed and fan cooled, the Lima Type E motors are designed for use in nonexplosive atmospheres containing excessive moisture or abnormal quantities of dirt, metallic dust, or other abrasives.

They can be furnished for horizontal, wall, or ceiling mounting. They are available from 1 hp, 900 rpm (Frame 213) through 40 hp, 3600 rpm (Frame 326 U). The motors conform to the new NEMA ratings.

For more information, *write* Dept. 149, Lima Electric Motor Co. Inc., Lima, Ohio.

SPRING STRESSES that formerly required premium-priced materials can now be handled by Duraflex,® which costs no more than regular phosphor bronze. Write for literature and samples, today.

LICENSED PROFESSIONAL ENGINEERS. MEMBERS AMERICAN SOCIETY FOR TESTING MATERIALS AMERICAN SOCIETY OF MECHANICAL ENGINEERS NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS

CONSULTING ENGINEERS — THE CARLSON COMPANY — MACHINE DESIGNERS

3457 WEIDNER AVE.
OCEANSIDE, L. I., N. Y.
TELEPHONE: RO 4-8181

Complete engineering and manufacturing service including design and development of special machinery, mechanical products and spring actuated mechanisms. Stress analysis, spring design, metallurgical data, heat treatment, plant layout, engineering reports, selection of materials and equipment. Tools and products.

August 1, 1958

The American Brass Company
414 Meadow Street
Waterbury, Connecticut

Gentlemen,

SUMMARY OF ENGINEERING LABORATORY REPORT No. 8158

SUBJECT: Fatigue Life and Endurance Limit testing of; "DURAFLEX" Superfine-Grain Phosphor Bronze and Commercial Quality Phosphor Bronze, 5% (A) spring quality strip material.

SPRINGS: Flat spring strip was made into the usual type of contact springs used in switches, relays and instruments. These springs were deflected at about 1 cycle per second in a specially built fatigue testing machine and the deflections recorded.

STRESSES: The springs were deflected from the initial free position of zero stress to a final position having a bending stress of 77,000 p.s.i.

This stress, for phosphor bronze strip is unusually high and is higher than stresses ordinarily recommended for Beryllium-Copper or Stainless Steel for such severe service.

RESULTS: Commercial Quality Phosphor Bronze, 5% (A) springs acquired a permanent set quite early and broke at an average number of deflections of 453,374.

"DURAFLEX" springs were still satisfactory, showed no permanent set, no loss of load and no breakage at 4,000,000 deflections.

CONCLUSION: Design stresses for "DURAFLEX" can be at least 50% higher than the stresses for Commercial Quality Phosphor Bronze, 5% (A) as shown in the TOOL ENGINEERS HANDBOOK.

LICENSED PROFESSIONAL ENGINEER HAROLD C. R. CARLSON No. 24571 STATE OF NEW YORK

Respectfully submitted,

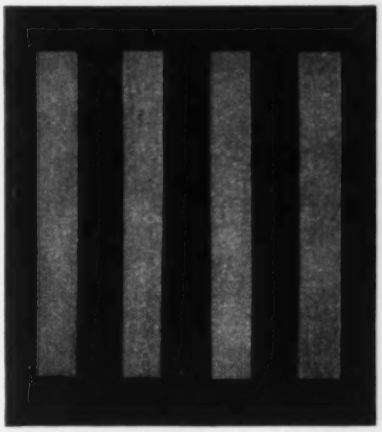
THE CARLSON COMPANY

Harold Carlson

Harold C. R. Carlson, P.E.
Licensed Professional Engineer

HC:R

THREE SPRINGS of regular Phosphor Bronze, 5% (A), actual size, took a permanent set at about 200,000 deflections and fractured at an average of 453,374 deflections.



FOUR SPRINGS of Duraflex Superfine-Grain Phosphor Bronze, 5% (A) were still satisfactory after 4,000,000 deflections.

DURAFLEX, available in Phosphor Bronzes (A), (C) and (D), in strip and wire, offers a host of opportunities to cut costs while maintaining or improving quality and performance. For further information and technical help to select the alloy to meet your needs—call in your American Brass Company representative, or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

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SUPERFINE-GRAIN PHOSPHOR BRONZE
A product of
ANACONDA®
Made by The American Brass Company

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TAYCO HOOKS

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TM factory-made
alloy sling chains!
Pat. No. 2646306

Patented Tayco Hooks are the strongest on the market, for they are drop-forged from special alloy steel with exclusive I-Beam design! Uniform heat-treating, stress-free links, Taylor's quality control and Test Certificate on assembled sling are additional advantages of TM factory-made Alloy Slings. Call your distributor or send for Bulletin 13.

S. G. TAYCO CHAIN CO., INC.
Hammond, Indiana
3505 Smallman St., Pittsburgh, Pa.

Taylor Made CHAIN SINCE 1873

NEW literature

Write directly to the company for a copy

Aluminum Casting Alloy

A brochure gives specifications, properties, and performance data of Kaiser A356, a high strength ductile casting alloy which performs well under applied stresses. Dept. NR-24, Kaiser Aluminum & Chemical Sales Inc., 919 N. Michigan Ave., Chicago, Ill.

Custom Finishing Systems

A 12-page booklet, A-659, shows typical custom finishing installations in automotive, appliance, and other industrial plants. Industrial Equipment Div., R. C. Mahon Co., East Eight-Mile Rd., Detroit 34, Mich.

Guide to Carbide Tools

A 52-page catalog on carbide blanks, inserts, tools, and holders tells how to choose and use various grades of Coromant carbide tools to obtain maximum cutting performances. No. 520. Coromant Dept., Sandvik Steel Inc., 1702 Nevins Rd., Fair Lawn, N. J.

Welding Electrode Selector

"Welding Guide and Catalog," 32 pages, contains a guide to selecting help in stainless, low-alloy, nonferrous electrodes for manual, automatic, and semiautomatic welding. Arcos Corp., 1500 S. 50th St., Philadelphia, Pa.

Coolant Development

"The Evolution of a Modern Cutting Fluid," describes the developments of coolants—water, oil, fortified petroleum bases, heavy duty, water soluble concentrates, and chemically conceived coolants containing no petroleum. E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

High Tensile Fastening

A new design manual, No. 5825, tells you how to select nut and bolt combinations for high tensile applications. Elastic Stop Nut Corp. of America, Union, N. J.

Coolant Clarifiers

A brochure describes flotation units used in metalworking operations. FB-102. Industrial Filtration Div., U. S. Hoffman Machinery Corp., Thompson Road Plant #1, Syracuse, N. Y.

V-Belt Drive Engineering Data

A 44-page bulletin describes a new line of V-belt drives that are smaller, cost less, weigh less, and require less space than conventional drives. A-695. Dodge Mfg. Corp., Mishawaka, Ind.

Sigma Welding Manual

"How To Do Sigma Welding," 48-page booklet, gives latest recommendations for Sigma welding all commercially available metals. F-7825. Linde Co., division of Union Carbide Corp., 30 E. 42nd St., New York 17, N. Y.

Aluminum Mill Product Data

An aluminum mill products brochure covers alloy and temper designations, fatigue and shear strengths, alloys available as foil, sheets, plates, wire, rods, bars, tubing, pipe, and extruded and structural shapes. Fabricating and finishing techniques are summarized. Dept. PRD-1, Reynolds Metals Co., Box 2346, Richmond, Va.

Steel Plate Handbook

"Steel Plates," is a ready reference for standard specifications, grades and qualities, chemical requirements, and manufacturing practices. It also contains tolerance and weight tables and miscellaneous estimating and design information. Bethlehem Pacific Coast Steel Corp., San Francisco 19, Calif.

Special Metals Brochure

An eight-page brochure gives data on wire, rods, and shapes, available in titanium, zirconium, tantalum, columbium, and other special metals. Dept. A, Johnston & Funk Metallurgical Corp., W. Kemrow Avenue, Wooster, Ohio.

Corrosion Resistant Tubes

"Solving Corrosion Problems in Industry," a 24-page publication, explains how bimetal tubes help solve corrosion problems in condenser and heat exchanger equipment. Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.

Steel Plant Services

The story of this company's services to the iron and steel industry—building and erection of blast furnaces, construction of ladles, hot metal, slag, and cinder cars—is told in a 20 page brochure. William B. Pollock Co., Youngstown 1, Ohio.

NEW BOOKS

Physical Laws and Effects, compiled by C. Frank Hix Jr. and Robert P. Alley, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y. 291 pages, $7.95.

New products, inventions, innovations, and industries often originate from an idea inspired by an unusual or unapplied law and effect. To set off fresh chains of thought, the authors have set up a triple cross-reference system to make the search for laws and effects practical. Its format is keyed to a short description, an illustration, and references.

Sale-Leasebacks and Leasing in Real Estate and Equipment Transactions, Harvey Greenfield and Frank K. Griesinger, McGraw-Hill Book Co., 327 W. 41st St., New York 36, N. Y. $15.

This book analyzes the pros and cons of using sale-leasebacks and equipment leasing. It discusses the business, tax, legal, and accounting factors involved, and gives case histories. It outlines the advantages, disadvantages, and characteristics of equipment leasing, rental-purchase plans, and tax treatment of purchase option plans.

Hydraulic Cylinder Manufacturer Specifies

Loading a minimum quantity of Ostuco tubing at the Shelby mill — in this instance only 150 feet.

"When you make hydraulic cylinders in 11 bore sizes . . . dozens of different pressure ratings . . . a variety of wall thicknesses and analyses — you've got a man-size tubing inventory problem.

"That's why we switched to Ostuco tubing made to our *exact specifications*. We like its availability in truly *small minimum quantities*. And with its consistently close tolerances, shipment after shipment, Ostuco tubing has *cut our machining time over 50 percent* . . . "

This is an actual case history of a manufacturer with a severe inventory problem. He required special tubing grades in minimum quantities. If you're faced with a similar situation, it's time you contacted your Ohio Seamless representative, listed in the Yellow Pages, or the mill at *Shelby, Ohio — Birthplace of the Seamless Steel Tube Industry in America.*

AA-8843

OSTUCO TUBING

OHIO SEAMLESS TUBE DIVISION

of Copperweld Steel Company · SHELBY, OHIO

Seamless and Electric Resistance Welded Steel Tubing • Fabricating and Forging

SALES OFFICES: Birmingham, Charlotte, Chicago (Oak Park), Cleveland, Dayton, Denver, Detroit (Huntington Woods), Houston, Los Angeles (Lynwood), Moline, New Orleans (Chalmette), New York, North Kansas City, Philadelphia (Wynnewood), Pittsburgh, Rochester, St. Louis, St. Paul, St. Petersburgh, Salt Lake City, Seattle, Tulsa, Wichita. CANADA: Railway & Power Engr. Corp., Ltd. EXPORT: Copperweld Steel International Company, 225 Broadway, New York 7, New York

MORE STRENGTH

LESS WEIGHT

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A. W. DYNALLOY Steel provides higher strength per unit of weight . . . lets you cut weight in fabricated products.

Specify DYNALLOY and realize these additional advantages: weldability, easy formability and resistance to corrosion and impact. In products where high strength and low weight are desirable, DYNALLOY will provide you with a means to higher quality production . . . lower costs . . . increased profits. Call your Alan Wood Representative today! He's always available and ready to help.

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Montreal, Toronto and Vancouver, Canada—A. C. Leslie & Co., Limited

March 16, 1959

Second Quarter Will Be Biggest Ever

STEELMAKERS are well on their way to a record breaking first half.

Last week's production was the largest in history: 2,630,000 ingot tons. Producers ran their furnaces at 93 per cent of capacity (up 2.5 points) and broke a standard set only the week before.

This month's output (11.5 million tons) will also set a record, easily surpassing that of October, 1956 (11,048,513). Second quarter production will be the biggest of any three months in industry annals: About 33.2 million tons (vs. 32.4 million in the fourth quarter of 1956).

SHIPPING PROBLEMS AHEAD?— Although they're well equipped to produce record tonnage, steelmakers may have trouble delivering it. A Chicago mill has lost some production because of its inability to ship. Trucks aren't being moved into its docks, loaded, and dispatched fast enough to permit capacity operations on finishing lines. Service centers can't build inventories as rapidly as they'd like because their trucks can make only one trip to the mill per day instead of the usual two. Congestion is the big problem today. The second quarter may see a freight car shortage.

SHEETS PACE MARKET— Still in heaviest demand of all steel products, sheets are being produced at capacity. Mills are fully booked for the first half on cold-rolled, hot-rolled, galvanized, and aluminum coated material. In most cases, entries include set-asides for established customers who have not determined their needs.

OTHER PRODUCTS TIGHTEN— Hot - rolled bar producers have set limits on the orders they'll accept from their district sales offices during the second quarter. Until now, orders have been taken on a first-come-first-served basis. A midwestern mill has announced that it won't issue any more rolling schedules for the second quarter.

Stronger demand for plates and structurals reflects a marked pickup in railroad buying. All other markets are brisk, so sheared plate mills will be running at capacity through June. Even if there's no strike, steelmakers think this July will be better than the last one. Reason: The market will have continued support from railroads and construction.

Line pipe producers have closed their books on the first half. Demand for oil country goods is heavy. Suppliers have cut off entries for March and April. Buttweld standard pipe is still available from stock, but seamless items are tightening.

AUTOMOTIVE OUTLOOK— Although sales reports haven't been too encouraging, automakers still think they'll build 5.5 million 1959 models (vs. 4.3 million '58s). Steel orders placed by General Motors Corp., are leveling off as the company achieves better balances of its inventories. Fisher Body Div. will buy less steel in May than it bought in April, mainly because of production cutbacks at Buick. By one estimate, GM will have enough steel by Mar. 31 to build 1 million cars.

Chrysler Corp., is expected to boost its flat-rolled inventory to 40 days by Apr. 30. It's scheduling production of 500,000 vehicles in the next five months, twice as many as it made in the last five.

Ford Motor Co., says its inventories are "normal" at 16 days. It plans to increase them "as much as it can" within the next month.

WHERE TO FIND MARKETS & PRICES

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*Current prices were published in the Mar. 9 issue and will appear in subsequent issues.

Metalworking Outlook—Page 51 Technical Outlook—Page 113

Sustained operating temperatures up to 400° F, as in guided missiles, are death to inferior electrical insulations and laminates. CDF glass-base laminates of Teflon*—the only laminates of their kind approved by the military—can take this punishment steadily.

LATEST HIGH-HEAT INSULATION SYSTEMS NEED CDF GLASS-BASE LAMINATES AND TAPES

Widest available range offers Teflon, epoxy, silicone, mica products for dimensional stability under continuous heat

As components and equipment grow smaller, and heat becomes more difficult to dissipate, CDF high-heat electrical insulations become increasingly important to electronic design. For nowhere else can such a wide range of quality insulations be found under one roof as at CDF.

FOR HIGH-HEAT PRINTED CIRCUITRY, CDF glass-base Di-Clad® laminates of Teflon* and epoxy exhibit best dimensional stability and current-carrying capacity. Constant operating temperatures of 300° F—soldering temperatures to 500°F—are readily met by these specialized CDF Di-Clad laminates.

HIGH-HEAT FLEXIBLE INSULATIONS. CDF offers a wide choice of insulating tapes made of Teflon, silicone varnish, silicone rubber, and Micabond®, with glass-cloth support. CDF tapes may be used either by hand wrapping or on automatic winding machines. Unsupported Teflon in colors available to meet MIL-STD 104.

TEFLON SPAGHETTI TUBING AND OTHER SPECIALTIES. Part of CDF's vast fabrication facilities is devoted to the production of custom parts from Teflon — spaghetti tubing, rods, sheets, and machined parts to rigid specifications.

NEW — *cementable* Teflon, bondable to itself and to other materials with commercial adhesives.

SEE SWEET'S Product Design File, Electronics Buyers' Guide, and other directories for the name and phone number of your CDF sales engineer. Then send your print or your problem, and we'll return specific technical data and test samples.

*trademark of DuPont tetrafluoroethylene resin

CDF CONTINENTAL-DIAMOND FIBRE

A SUBSIDIARY OF THE Budd COMPANY • NEWARK 85, DEL.

Tubemakers Predict 20% Sales Gain

SPECIALTY TUBE producers view 1959 as a year of moderate recovery. They look for a 20 per cent increase in shipments of mechanical tubing (see table) and a 12 per cent pickup in shipments of pressure tubing.

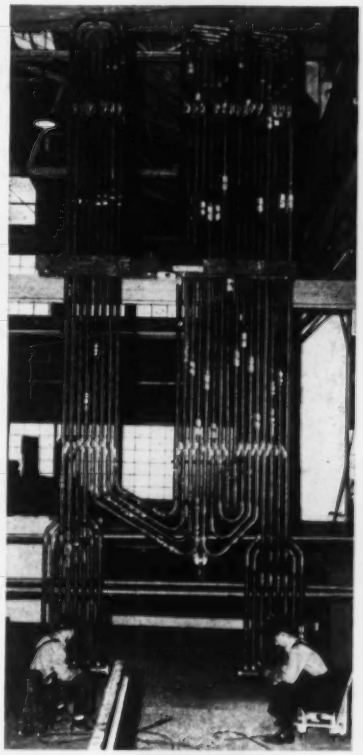
Demand for both types is heavy because: 1. Inventories were abnormally low when the business upturn started. 2. Current stocks are hardly big enough to sustain day-to-day operations. 3. Users are trying to hedge against a threatened midyear steel strike.

• **Is Business Really Better?**—Tubemakers believe their sales would have risen moderately this year even if there had been no danger of a strike. Says one: "We saw solid improvement in January, weeks before the scramble began. We'd be running at 70 per cent of capacity (vs. 50 per cent a year ago) if the strike issue hadn't come up." Adds another: "If you start with 50 per cent operations, you can add 25 points for higher consumption and 20 points for hedging."

Whether there's a strike or not, tubemakers expect a letdown in the third quarter as consumers go on vacation. The drop may not be too sudden or severe because hedge buying has a lot of momentum. Part of the current demand may spill into July and August. What's more, users who were unable to place their orders after the buying rush began will come into the market when the pressure is off. Unless the strike lasts more than a month, it will have no impact on tonnage shipped for the year.

• **Mechanical Tubes**—Used mainly in the automotive, farm implement, industrial machinery, and electrical industries, mechanical tubing was hit hard by the recession. Shipments plummeted last year because of warehouse cutbacks, generally tighter inventory controls, and less buying by leading customers. Since January, orders have picked up markedly. February entries of a Detroit tube mill were double January's, with most of the business coming from auto, conveyor, construction equipment, and appliance manufacturers. Some buyers are booking through October so that they'll be protected if there's an extension of the steelworkers' contract.

"We're having a terrific rush," a Pittsburgh sales executive comments. "It wouldn't have been so bad if the automotive companies had been carrying normal (30 to 45 day) inventories, but they were trying to get by with 15 to 20 day supplies. Everybody was caught short. The small sizes (under 4½ in. OD) are especially tight." Adds a competitor: "Automakers are determined to get all the steel they'll need for the '59 models out of the mills before the strike deadline. Everything that would normally be used in the third quarter is being taken in the second. If customers don't get on the books in March, they won't get delivery in the first half."



Babcock & Wilcox Co.

Strike Hedge Buying Spurs Recovery of Mechanical and Pressure Tubing

(Shipments in net tons)

	Mechanical	Pressure
1959*	675,000	275,000
1958	561,243	245,353
1957	773,945	395,346
1956	949,846	384,988
1955	965,829	276,068
1954	674,214	277,208
1953	1,089,480	440,675

*Estimated by STEEL.
Source: AISI.

• **Pressure Tubes**—Sold principally to boilermakers, refrigerator manufacturers, machinery builders, utilities, and the chemical and refining industries, pressure tubing made a poorer showing last year than mechanical pipe. Although there has been a modest pickup in orders lately, producers' facilities are more than equal to the demand. Boilermakers know what jobs they'll be doing in July and August, so they're just trying to cover themselves. There's little emphasis on inventory accumulation.

"If it weren't for the stuff that moves to the oil country, I'd guess that 1959 shipments of pressure tubing would be less than last year's," a leading producer declares. "We're at the mercy of the power industry's buying cycles, and we're just at the end of one. As the economy recovers, utilities are discovering that their margin of standby power isn't adequate. Their expansion plans will be on the drawing boards for a year. Then it will take a couple years to build new plants. The next big power year will start late in 1961 or in 1962."

Atomic reactors and missiles are significant markets for seamless tubing (stainless, especially), but producers have a hard time telling how much steel is used in those fields. Reason: Much of the material is processed by redraw mills and sold through distributors. Neither is a tonnage market, but both are important from a dollar standpoint.

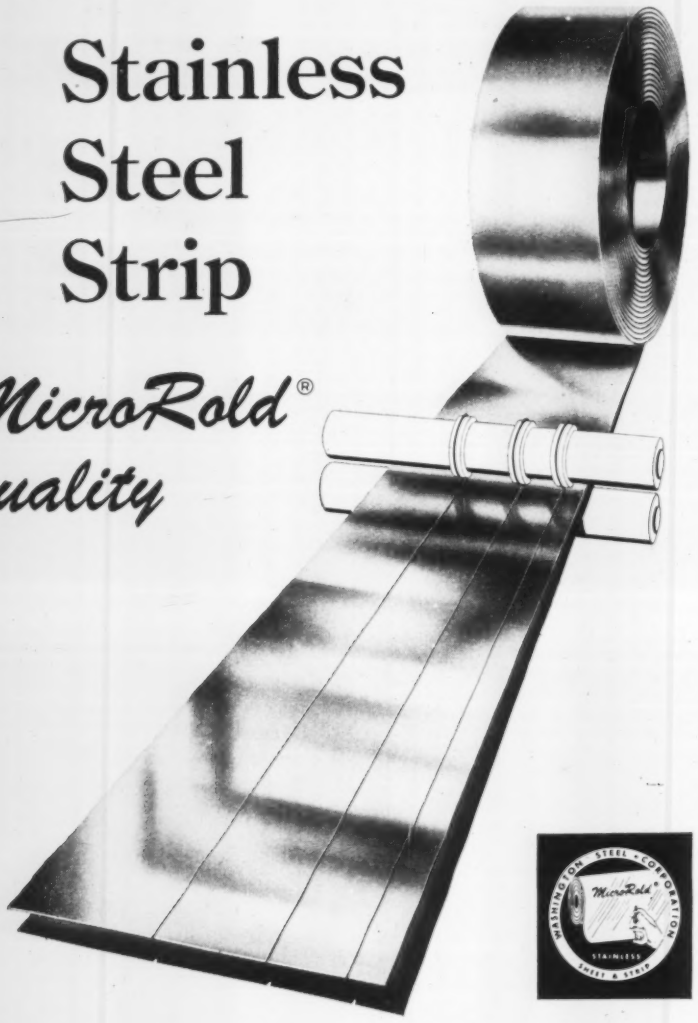
• **Foreign Competition** — By one

estimate, foreign steelmakers took slightly more than 5 per cent of the domestic market for tubular goods of all kinds last year. Pressure and mechanical tubing are coming into the U. S. from Sweden, England, Germany, Switzerland, Italy, and Japan. Areas affected: Eastern and western seaboards and Gulf ports. A Pittsburgh producer reports that foreign mills are "underselling us by 20 to 25 per cent." Says another firm: "We're affected mainly on sales of pressure tubing to the Navy. Last year, we weren't able to sell a bit. The Philadelphia office of GSA has been buying mainly from Tube Investments Ltd. of England. They're 15 to 20 per cent lower than we are on the average."

Condenser tube sales of a west coast redraw mill dropped sharply last year because of foreign competition. Says a company official: "Quite a few fabricators in Los Angeles and Texas are buying foreign tubes. Most of it comes from Germany and costs about a third less than ours. Imports aren't much of a factor in electricweld mechanical tubing. That's because we have 10 or 12 producers in the Los Angeles area. Competition is so stiff that foreign mills would have a hard time underselling them."

Stainless Steel Strip

MicroRold® *quality*



WASHINGTON STEEL CORPORATION

3-0 Woodland Ave., Washington, Pennsylvania

Sheets, Strip . . .

Sheet & Strip Prices, Pages 156 & 157

Complaints, mainly from sheet buyers, about slow deliveries of steel are getting more numerous. Most of the tonnage users want speeded is for inventory.

This has created a problem at Inland Steel. Its cold reduction department, which commenced operations late last year, hasn't got up to capacity operation as fast as had been anticipated. Sheets had been booked on the assumption the mill would be able to deliver at top speed. Because of operational bugs, output fell behind and delay in deliveries amounts to about three weeks. Some of the complaints to Inland stem from this delay. Production has been improved and the company is making some headway in catching up.

A few complaints about slow deliveries have come from industries which have been picking up, such as appliances, farm and construction equipment. In these cases, expanding demand for finished items has made planned inventories inadequate, so more steel is being sought.

Consumers, though, are showing little interest in third quarter.

Most sheetmakers are fully committed for the first half, including set-asides with late specifications yet to be filled in. This is being reflected in a slight slackening in the pace of new bookings. Some sellers expect an easing in auto requirements shortly unless car sales spurt.

Few mills are accepting tonnage orders for shipment beyond June 30, many of them feeling they will have substantial carryovers going into third quarter, despite their efforts to keep ordering within reasonable bounds.

Wire . . .

Wire Prices, Pages 157 & 158

Some wiredrawers report orders are coming in at the best rate in many months. Pittsburgh area producers say if it weren't for seasonal

weakness in welded reinforcing mesh, their mills would be engaged at capacity. Orders for manufacturers' wire are coming in faster than they can be processed. One district mill's backlog is the largest in eight years.

Automotive demand is strong because inventories are abnormally low (less than 15 days) and business prospects are improving.

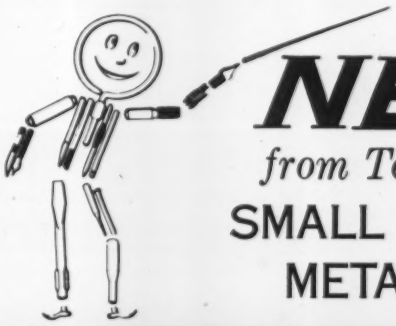
Because of the midyear strike threat, many buyers are trying to accumulate 60 to 90 day supplies before July 1. The best delivery promise one Pittsburgh maker can give on standard wire items is May 15. Its March shipments will exceed last month's by 20 per cent.

In New England, the bulk of hedge buying is expected to extend through April and May, but bookings for March shipment are the highest in more than a year, some area producers report. Consumption by users of cold heading, spring, and manufacturers' wire has increased moderately. This has stimulated inventory buying slightly beyond earlier estimates.

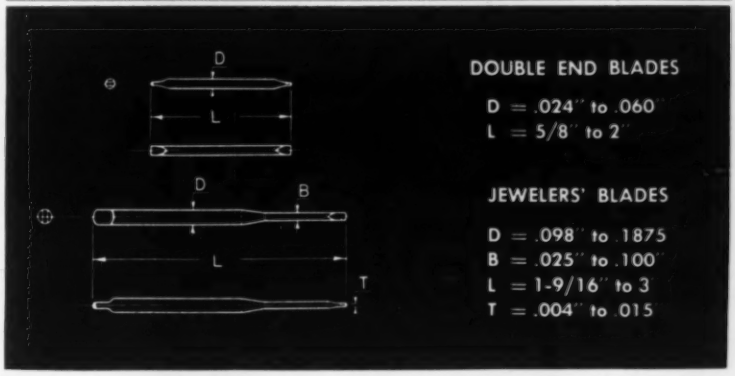
Rod imports are heavier and are adversely affecting semifinished sales. On the Pacific Coast, it's estimated imports of wire nails into the northern California area alone approached 20,000 tons last year. An equal amount is said to have been shipped into southern California.

Southwestern sellers note a substantial increase in demand for wire, providing some evidence that foreign shipments are less pressing in the market. In this connection, one foreign mill which had declared itself out of the market in late February, has returned with a new price list reflecting increases averaging $4 a ton. Another major foreign mill, which has been shipping substantial tonnages of steel through Texas ports, was out of the market in early March, and is expected to post higher prices when it returns.

Consumers in the East appear to be waiting until the last minute before doing any strike hedge ordering. Sellers in the area, however, expect second quarter business will be considerably better than at present, and they look for the pickup in demand to accelerate within the next two or three weeks.

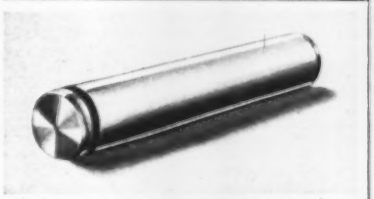


NEWS
from Torrington on
SMALL PRECISION METAL PARTS



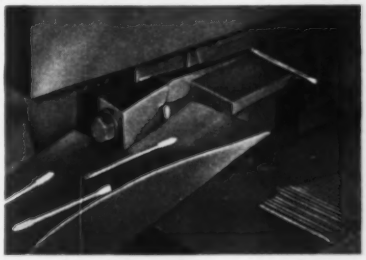
"Custom manufacture" has a special meaning at Torrington, where our Specialties Division produces a tremendous variety of small precision metal parts. For our engineers often help in designing parts for our customers, and as frequently develop special equipment or methods for most efficient production.

For example, one of our current contracts is for jewelers' screwdriver blades. In this case, our engineers decided to swage these parts to give the required high-strength characteristics without stress concentration points and tool marks. Other features of these parts are good dimensional accuracy and closely controlled heat treating for hardness and temper.



In another case, we received a blueprint of a special pinion axle with an accurately cut retaining ring groove at one end. The customer inquired whether this part could be produced at about the same price as a straight cylindrical axle with an uninterrupted OD. The answer was "Yes!" Specialties engineers decided that high-speed cutoff and groove-turning equipment would have to be built to cope with the high volume involved. Special pinion axles have now joined the great number of parts being produced by Torrington Specialties Division.

Whatever the part, whatever the operation—even operations tailored to the part requirements—Torrington's Specialties Division is uniquely equipped to handle your small precision parts contracts. Highly specialized fluting operations, for example, permit volume production to close tolerances. Precision swaging, knurling, forming, milling, drilling are among other operations for which we are fully equipped. Advanced heat treat and statistical quality control methods help provide the quality product you require.



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TORRINGTON SPECIAL METAL PARTS

Makers of Torrington Needle Bearings

Tubular Goods . . .

Tubular Goods Prices, Page 159

Reflecting the recent drop in the price of zinc to 11 cents a pound, East St. Louis, Ill., producers of tubular goods have automatically lowered their prices on galvanized pipe by raising their published discounts.

Under the new schedule, discounts on 1/8 in. and 1/4 in. are raised 2 points; on 3/8 in., 3 points; on 1/2 in., 3/4 in., and 1 in., 2 points; on 1 1/4 in., 1 1/2 in., and 2 in., 1 1/2 points; on 2 1/2 in. and larger, 1 point. The new schedule of discounts will be found on Page 159

Consumers are anticipating price increases after midyear, strike or no strike. As a result most buyers are ordering tonnage for shipment before June 30. Demand for seamless tubing extends into May and a seasonal pickup in standard butt-weld is getting underway.

Pipe imported from Japan, Australia, West Germany, England, and France is reported underselling the domestic product by as much as 28 per cent on the West Coast.

Cast iron pipe sales are picking up seasonally. First quarter volume is estimated to about equal that a year ago. The outlook for second quarter is promising.

A contract for water pipe for Port Angeles, Wash., went to concrete. The alternative called for 240 tons of 14 to 6 in. cast iron pipe.

Iron Ore . . .

Iron Ore Prices, Page 161

Stocks of iron ore (U. S. and Canada) totaled 61,655,965 gross tons at the end of January, reports the American Iron Ore Association and the American Iron & Steel Institute. The total compared with 68,833,658 tons at the end of December, and with 61,932,490 tons at the end of January, 1958. (For the breakdown of supplies by district and sources, see the accompanying table.)

Consumption of ore in January amounted to 10,324,989 gross tons (U. S. and Canada). In the preceding month the total was 10,084,994, and in January, 1958, it was 8,029,875 tons.

Active blast furnaces in the U. S. and Canada at the end of January numbered 211 of which nine were in Canada. That compares with 201 (nine in Canada) at the end of December, and 176 (eleven in Canada), at the end of January, 1958.

Steel Bars . . .

Bar Prices, Page 155

Some hot rolled bar producers have set limits on the orders they'll accept from their district sales offices during the second quarter. Until now, orders have been taken on a first come-first served basis. While a little tonnage is still available for late April and May shipment, most mills are virtually out of the market for second quarter on the basis of orders on books, and set-asides for regular customers.

Demand shows no weakening. The mills at Pittsburgh report they are being flooded with requests for extra tonnage from customers they haven't served in months.

The improvement in demand is diversified. Current needs of some consumers are heavier than others, but there's a general gain. In practically all instances, hedge buying against a possible midyear strike enters the picture. Among the more active buyers are fastener makers who report increases in demand in all areas of their market, particularly manufacturing assemblies.

Gains are also reported in hot and cold rolled alloy bars, and in cold finished bars. Cold drawers are pressing for quick deliveries of hot bars. Fairly early shipments of cold drawn bars are available from converters with hot stock on hand. Demand for leaded alloy bars is well sustained, and supply appears adequate.

Forge shops are more actively in the market, notably New England units with automotive orders.

Plates . . .

Plate Prices, Page 155

Plate demand is swelling, with increasing emphasis on inventory building. Makers of sheared plates are not on allocation, but they are screening orders closely. A little tonnage is still available for late April shipment, but schedules are

Iron Ore Statistics—January, 1959

(Gross tons)

STOCKS ON HAND AT FURNACES AND DOCKS, JAN. 31, 1959

	U. S. Ores		Canadian Ores		Foreign Ores	Total
	L. Superior	Other	L. Superior	Other		
At U. S. Furnaces:						
Eastern	4,725,898	213,368	171,911	1,482,594	4,607,252	11,201,023
Pitts.-Valley	9,773,209	35,332	589,235	2,268,507	3,707,947	16,374,230
Cleve.-Detroit	8,399,724	86,310	280,779	340,120	315,796	9,422,729
Chicago	11,058,184	(a)	(a)	.....	(a)	11,058,184
Southern	(a)	2,162,373	.....	(a)	2,399,205	4,561,578
Western	.....	983,645	.....	.....	.....	983,645
Total	33,957,015	3,481,028	1,041,925	4,091,221	11,030,200	53,601,389
At U. S. Docks:						
Lake Erie	3,780,351	.....	91,193	1,598,359	.....	5,469,903
Other U. S.	.....	.....	.....	(a)	(a)	(a)
Total U. S. Stocks	37,737,366	3,481,028	1,133,118	5,689,580	11,030,200	59,071,292
Total Canada	1,897,899	.....	123,041	480,178	83,555	2,584,673
Total U. S. and Canada	39,635,265	3,481,028	1,256,159	6,169,758	11,113,755	61,655,965

CONSUMPTION OF ORE AND AGGLOMERATES—JANUARY, 1959

	U. S. Ores		Canadian Ores		Foreign Ores	Total
	L. Superior	Other	L. Superior	Other		
In U. S.:						
Eastern	642,423	167,050	36,654	187,243	902,832	1,936,202
Pitts.-Valley	1,878,322	127,570	75,817	414,133	511,864	3,007,706
Cleve.-Detroit	1,162,545	14,404	98,762	21,138	108,388	1,405,237
Chicago	2,106,261	(a)	(a)	.....	(a)	2,106,261
Southern	(a)	480,411	.....	(a)	286,766	767,177
Western	.....	605,182	.....	.....	.....	605,182
In U. S.:						
Blast Furnaces	4,444,964	958,261	167,163	380,700	748,813	6,699,901
Steel Furnaces	164,167	99,516	112	9,413	482,303	755,511
Sintering (1)	1,180,420	327,301	43,958	232,401	578,304	2,362,384
Miscellaneous (2)	.....	9,539	.....	.....	430	9,969
Total U. S.	5,789,551	1,394,617	211,233	622,514	1,809,850	9,827,765
In Canada:						
Blast Furnaces	202,436	.....	59,718	94,170	.....	356,324
Steel Furnaces	7,909	.....	.....	10,242	13,052	31,203
Sintering (1)	81,227	.....	.....	28,434	.....	109,661
Misc. (2)	.....	.....	.....	36	.....	36
Total Canada	291,572	.....	59,718	132,882	13,052	497,224
Total U. S. & Canada	6,081,123	1,394,617	270,951	755,396	1,822,902	10,324,989

(a) Included in other districts.
(1) Consumed at plants not located at mine sites.
(2) Sold to nonreporting companies, or used for purposes not listed.
Data from American Iron Ore Association and American Iron & Steel Institute.

filling up rapidly for shipments in May and beyond.

Sellers report a substantial pick-up in railroad requirements. Car tonnage is receiving increasing attention—due not so much to volume as to pressure for early delivery. As has often been the case, the railroads are coming into the market for equipment at a time when their needs are overdue, and steel supply is stringent.

Demand from the carriers is the strongest it has been since late 1957.

Sheared plate mills will be running at capacity through June. One maker reports its 96 in. mill will be closed for April. The best delivery it can promise from its 100 and 160 in. mills is early May.

Orders are being taken for the third quarter, and one Pittsburgh producer says it will "be amazed if we get up to June 1 and don't have a full book for July."

It's assumed that buyers who fear a midyear strike will want to get their orders in before July 1 so that they'll be first in line for delivery when production resumes. Even if there's no strike, platemakers think business in July will be better than that in July last year. Reason: The market will have continued support from railroads and the construction industry.

Concrete cylinder construction will be used for two major water pipe jobs in the Pacific Northwest, originally involving 20,000 tons of plates. The Tolt River (Seattle) project will be fabricated by United Concrete Pipe Corp., Auburn, Wash., and American Pipe & Construction Co., Portland, Oreg., the awards involving about 8000 tons of plates, rods, and sheets each. The Portland firm will also fabricate 5½ miles of 48 in. pipe for the Sultan River project, Everett, Wash.

Stainless Steel . . .

Stainless Steel Prices, Page 159

Stainless steel wire is reported moving in somewhat heavier volume. Reason: Inventory building.

A $775,000 program to increase Armco Steel's stainless steel output is scheduled to begin this month at its Baltimore Works. Two double ingot heating furnaces and three heat treating furnaces are to be installed.

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Distributors . . .

Prices, Page 160

Orders are flowing into steel service centers in noticeably larger volume. Some distributors say their volume is the best it has been in months. Earlier, the pickup in orders going to distributors lagged the pickup in mill orders. It now looks as though consumers are turning to the warehouses to fill holes in their inventories.

Distributors at some points—notably the New York area—are still "disappointed and bewildered" by lack of business, but, in general, they agree order volume is picking up. Buffalo sellers say the outlook for business has improved. They expect volume to hold up through the summer.

On the West Coast, distributors' inventories are fairly high. Sales are good, but some price cutting is reported at Los Angeles. Inquiries are up from a month ago there. Service centers in the Pacific Northwest say March sales show improvement over those in February and are expected to come close to those in March, 1957.

Some Houston area distributors report that although March began with a business rush after record rains had washed out considerable February volume, they are becoming cautious. They fear that foreign mills may flood their marketing area with relatively low-priced steel in an attempt to cash in should a steel strike cut off supplies.

In view of heavy first half 1959 shipments by the mills, the number of distributors taking the view a business slump may come during third quarter is increasing.

Structural Shapes . . .

Structural Shape Prices, Page 155

Although bridge and road construction is not as active as fabricators had anticipated, volume is rising. This is also true in other building lines, including a mild gain in industrial construction.

Better current volume also reflects a marked pickup in railroad buying. Items used in freight car construction are being ordered for March and later delivery. One Pittsburgh area producer's 28 and 32 in. mills are "quite full." It can still take first half tonnage for its lighter standard structural mills.

Instead of waiting for third quarter, when a strike may choke off production, some fabricators are taking in all the wide flange beams they can get for specific jobs slated for July and August. Fabricators in New England, though, while placing forward orders for standard shapes in slightly heavier volume, are holding purchases of wide flange and larger sizes close to contract requirements.

Powerplant estimating is slightly more active in New England, one 1500 ton contract being placed at Bridgeport, Conn. Bridge estimating is also heavier with 2000 tons placed for the Fall River-Providence Expressway. This will take 30 bridges, including a crossing of the Taunton River, near Fall River, Mass.

Bethlehem Pacific Coast Steel Corp., Seattle, has been awarded 1150 tons of shapes for an Idaho state undercrossing at Pocatello. The Clear, Alaska, missile detection base project is being redesigned, so that the amount of steel required is in doubt. Originally, plans called for 3200 tons. Washington State opens bids March 24 for the second Lake Washington bridge, involving 700 tons of shapes.

Tool Steel . . .

Tool Steel Prices, Page 159

Shipments of high speed and tool steel (excluding hollow drill steel) totaled 7545 net tons in January, reports the American Iron & Steel Institute. It was up from the 6835 tons shipped in the preceding month, and also the 6549 tons shipped in January, 1958.

Fasteners . . .

Bolt, Nut, Rivet Prices, Page 158

Effective March 9, Youngstown Sheet & Tube Co., Youngstown, raised prices (per 100 pieces) on mine roof bolts, rock anchor bolts, and roof plate washers, 8 to 10 per cent. These items are produced at the company's Struthers, Ohio, plant.

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Steel Shipments Go Up 12% in January

Shipments of finished steel products in January totaled 6,186,168 net tons, a 12 per cent increase over December's shipments, reports the American Iron & Steel Institute.

The automotive market classification was shipped 1,458,737 tons, a greater amount than in any month during the last two years. The total was 48 per cent greater than that in the same month a year ago and 10 per cent more than in December, 1958. January automotive steel shipments accounted for more than 24 per cent of the total domestic tonnage.

Warehouses and distributors received 1,070,523 tons during the month, up nearly 55,000 from the December total.

Construction, including maintenance, ranked third with 743,714 net tons, an increase of more than 9 per cent, or about 62,000 tons over the previous month's total. Shipments for containers amounted to 542,452 tons, compared with 246,196 in December. Machinery, industrial equipment and tools took 381,911 tons, a total last exceeded in June, 1957, and representing an 11 per cent increase over the December, 1958, total of 342,712 tons.

Shipments of cold-rolled sheets reached the highest level since December, 1955, totaling 1,338,906 net tons. The total was nearly 7 per cent greater than that of the previous month and was more than 53 per cent greater than shipments of the product in January, 1958.

Other major product shipments during January were: Hot-rolled sheets, 731,017 tons; hot-rolled bars (including light shapes), 623,225; plates, 508,896; and electrolytic tin plate, 417,210 tons.

Car Shortage Is Feared

Not much trouble is encountered now in getting freight cars to ship steel, but shippers are fearful of a car shortage in May and June when production of steel products will be bigger and pressure for delivery will be greater.

Truck congestion is reported at some mill docks. This is sure to get worse. It's impossible to get trucks loaded and out fast enough to make room for arriving trucks. An example in Chicago: A warehouse sometimes rents trucks to pick up steel at the mills. Ordinarily, a truck is able to make two round trips a day. Now, it frequently happens that only one trip can be made because of congestion at the steel plant.

Another problem has arisen in connection with structural steel. Railroads recently modified some rates downward for cars loaded heavier. Naturally, consumers request that girders be shipped under these more favorable rates obtained through heavier loading. Structurals being bulky and hard to handle, the mills find it difficult to load cars to the minimum to qualify for the lower weight, and it takes extra jiggering of the beams on the cars to get minimum loading weight.

Loading thus takes longer and costs more. It's not easy to put a dollar and cents figure on savings to be gained by heavier loading because rates vary.

Semifinished Steel . . .

Semifinished Prices, Page 155

With steelmakers first half order books pretty well loaded, ingot production is being pushed at a record breaking pace. Ingot operations last week hit 93 per cent of capacity, highest since the week ended Mar. 31, 1957. Output last week amounted to about 2,633,000 net tons, a weekly record.

In the Southwest, the leading mill expects March to be its best month in two years. Despite heavy rains and a 28 day month, February shipments were heavier than January's, the previous banner month. The mill is virtually booked to capacity through second quarter on all products except reinforcing bars.

Jones & Laughlin Steel Corp., Pittsburgh, plans to boost steelmaking capacity of its No. 4 open hearth shop at Pittsburgh by nearly 8 per cent. Plans for other phases of the program have not been completed. Aside from the 11 modern furnaces in the No. 4 shop, J & L has ten other open hearths at Pittsburgh.

The initial phase of the program will increase the No. 4 shop's monthly capacity by about 15,000 tons—it's now 195,000 tons. It will be done by boosting the average size of heats and by use of larger ladles.

DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

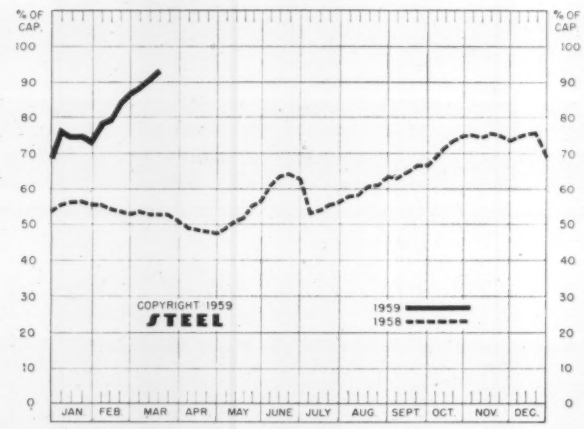
	Week Ended Mar. 15	Change	Same Week 1958	Same Week 1957
Pittsburgh	94.0	+ 3.0	53.5	97.5
Chicago	95.0	+ 2.0*	58	93
Eastern	91.0	+ 4.0	56	98
Youngstown	92.0	+ 1.0	52	96
Wheeling	91.0	— 2.0	70	92
Cleveland	91.0	+ 2.0	38	87
Buffalo	105.0	+ 2.5	36.5	100
Birmingham	85.5	+ 6.0	49.5	95.5
Cincinnati	93.5	— 1.0	52	81
St. Louis	88.0	— 9.0*	79	91
Detroit	97.5	— 2.0	45.5	93
Western	94.0	— 1.0	69	105
National Rate	93.0	+ 1.0*	52.5	94.5

INGOT PRODUCTION‡

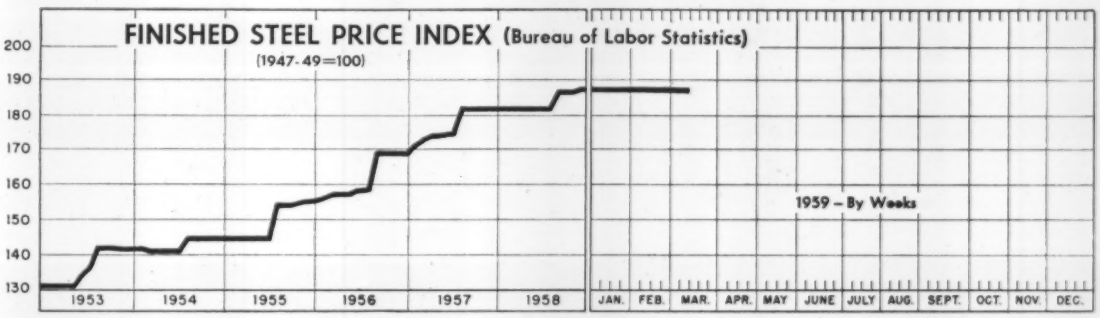
	Week Ended Mar. 15	Week Ago	Month Ago	Year Ago
INDEX (1947-49=100)	161.9	159.1	147.6	91.1
NET TONS (In thousands)	2,600†	2,556	2,371	1,463

*Change from preceding week's revised rate. †Estimated. ‡American Iron & Steel Institute. Weekly capacity (net tons): 2,831,331 in 1959; 2,699,173 in 1958; 2,559,490 in 1957.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Mar. 10, 1959	Week Ago	Month Ago	Feb. Avg	Year Ago
186.7	186.9	187.0	187.0	181.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended March 10

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.615
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.673
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.905
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.253
		Pipe, Line (100 ft)	199.53
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	March 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	239.15	189.74
Index in cents per lb	6.713	6.713	6.713	6.479	5.140

STEEL's ARITHMETICAL COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$145.42	$113.73
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	56.54
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	56.04
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	57.27
Steelmaking Scrap, GT	41.66	42.33	42.50	36.83	24.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	March 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.425	4.15
Bars, H.R., Chicago	5.675	5.675	5.675	5.425	4.15
Bars, H.R., deld. Philadelphia	5.975	5.975	5.975	5.725	5.302
Bars, C.F., Pittsburgh	7.65*	7.65*	7.65*	7.30*	5.20
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.275	4.10
Shapes, Std., Chicago	5.50	5.50	5.50	5.275	4.10
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.545	4.38
Plates, Pittsburgh	5.30	5.30	5.30	5.10	4.10
Plates, Chicago	5.30	5.30	5.30	5.10	4.10
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.10	4.10
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.10	4.10
Plates, Claymont, Del.	5.30	5.30	5.30	5.10	4.10
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	4.925	3.925
Sheets, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Chicago	6.275	6.275	6.275	6.05	4.775
Sheets, C.R., Detroit	6.275	6.275	6.275	6.05-6.15	4.975
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.60	5.275
Strip, H.R., Pittsburgh	5.10	5.10	5.10	4.925	4.425
Strip, H.R., Chicago	5.10	5.10	5.10	4.925	3.925
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.15	5.45
Strip, C.R., Chicago	7.425	7.425	7.425	7.15	5.70
Strip, C.R., Detroit	7.425	7.425	7.425	7.25	5.45-6.05
Wire, Basic, Pittsburgh	8.00	8.00	8.00	7.65	5.525
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.95	6.55
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.30	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$96.00	$75.50
Wire rods $\frac{7}{32}$-$\frac{5}{8}$" Pitts.	6.40	6.40	6.40	6.15	4.525

PIG IRON, Gross Ton

	March 11 1959	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$67.00	$57.00
Basic, Valley	66.00	66.00	66.00	66.00	56.00
Basic, deld., Phila.	70.41	70.41	70.41	70.41	59.66
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	56.50
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	60.16
No. 2 Fdry, Birm.	62.50	62.50	62.50	62.50	52.88
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	70.20	60.43
Malleable, Valley	66.50	66.50	66.50	66.50	56.50
Malleable, Chicago	66.50	66.50	66.50	66.50	56.50
Ferromanganese, net ton†	245.00	245.00	245.00	245.00	200.00

†74-76% Mn, Duquesne, Pa.

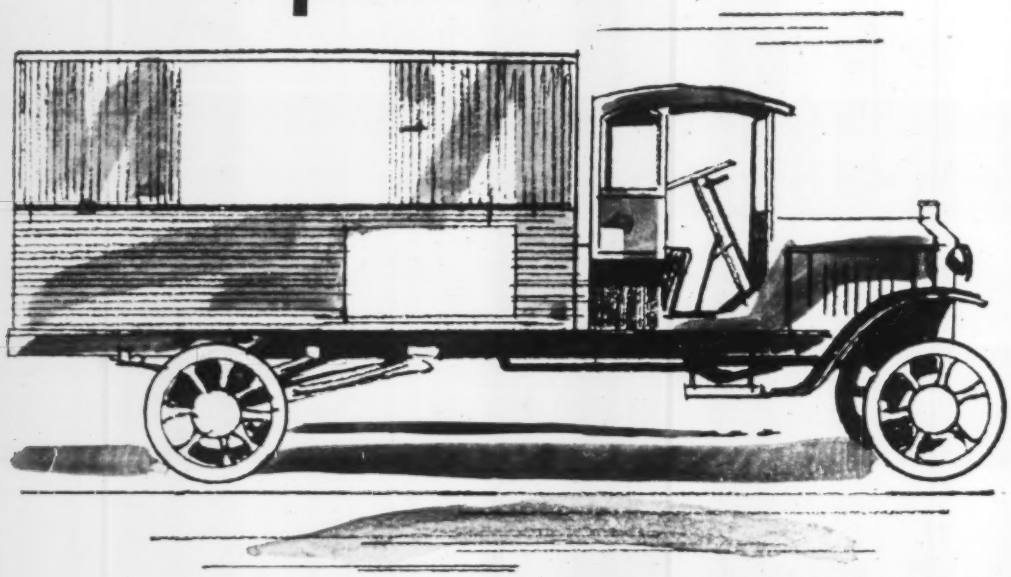
SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$44.50	$44.50	$43.50	$36.50	$25.50
No. 1 Heavy Melt, E. Pa.	38.00	40.00	40.00	38.50	22.00
No. 1 Heavy Melt, Chicago	42.50	42.50	44.00	22.00	25.00
No. 1 Heavy Melt, Valley	45.50	46.50	48.50	37.50	23.50
No. 1 Heavy Melt, Cleve.	41.50	42.50	44.50	33.50	20.50
No. 1 Heavy Melt, Buffalo	39.50	39.50	41.50	28.50	24.00
Rails, Rerolling, Chicago	62.50	62.50	64.50	55.50	36.50
No. 1 Cast, Chicago	48.50	48.50	49.50	41.50	31.50

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.00	$15.00	$15.25	$15.25	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	30.50	30.50	25.25

Delivering lo$t profit$?



You can't afford to deliver your goods in obsolete equipment; that would be poor economy and tough on your name.

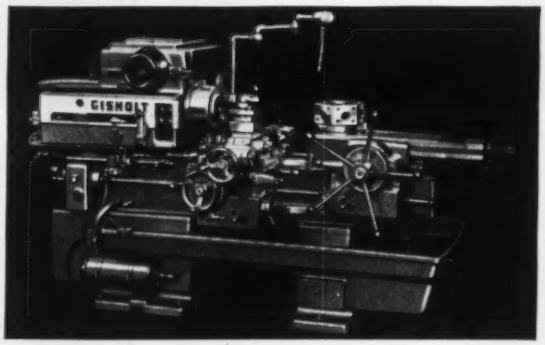
But what about obsolete production equipment? That is out of sight, but it delivers a far greater loss in wasted time and manpower, excessive unit costs and reduced quality.

You might be surprised how easy it is to turn these losses into profits with the self-liquidating production advantages of a modern Gisholt Turret Lathe.

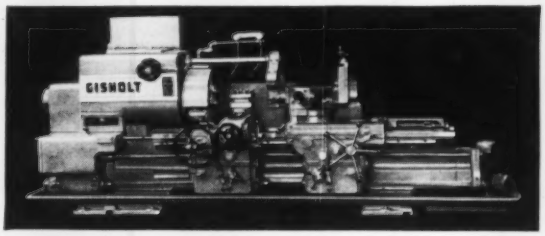
Here is the capacity with the versatility you need to cut critical unit costs on a wide variety of tough jobs. Here is the easy operation you need with the easy setup to minimize tooling and change-over time. Here is the extreme accuracy you need to maintain closest tolerances and highest quality. Here is the extra power with the rigidity to take full advantage of modern cutting tools.

Here are all the advantages you need to keep ahead of demands for higher, faster production and lower costs.

Ask your Gisholt Representative about Gisholt Ram and Saddle Type Turret Lathes—how they can be put to work in your plant earning extra profits, paying for themselves. Call him today or write for literature.



Gisholt Ram Type Turret Lathe



Gisholt Saddle Type Turret Lathe

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin

Investigate Gisholt's Extended Payment and Leasing Plans

Turret Lathes • Automatic Lathes • Balancers • Superfinishers • Threading Machines • *Factory-Rebuilt Machines with New Machine Guarantee*

Steel Prices

Mill prices as reported to STEEL, March 11, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 156, footnotes, page 158.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 .....$76.00

INGOTS, Alloy (NT)
Detroit S41 .....$82.00
Economy,Pa. B14 .....82.00
Farrell,Pa. S3 .....82.00
Lowellville,O. S3 .....82.00
Midland,Pa. C18 .....82.00
Munhall,Pa. U5 .....82.00
Sharon,Pa. S3 .....82.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ..... 80.00
Buffalo R2 ..... 80.00
Clairton,Pa. U5 ..... 80.00
Ensley,Ala. T2 ..... 80.00
Fairfield,Ala. T2 ..... 80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ..... 80.00
Johnstown,Pa. B2 ..... 80.00
Lackawanna,N.Y. B2 .. 80.00
Munhall,Pa. U5 ..... 80.00
Owensboro,Ky. G8 .... 80.00
S.Chicago,Ill. R2, U5 .. 80.00
S.Duquesne,Pa. U5 .... 80.00
Sterling,Ill. N15 ..... 80.00
Youngstown R2 ..... 80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ..... 99.50
Canton,O. R2 ..... 102.00
Clairton,Pa. U5 ..... 99.50
Conshohocken,Pa. A3 .. 104.50
Ensley,Ala. T2 ..... 99.50
Fairfield,Ala. T2 .... 99.50
Farrell,Pa. S3 ..... 99.50
Fontana,Calif. K1 .... 109.00
Gary,Ind. U5 ..... 99.50
Geneva,Utah C11 .... 99.50
Houston S5 ..... 104.50
Johnstown,Pa. B2 .... 99.50
Lackawanna,N.Y. B2.. 99.50
LosAngeles B3 ..... 109.00
Midland,Pa. C18 .... 99.50
Munhall,Pa. U5 ..... 99.50
Owensboro,Ky. G8 .... 99.50
Seattle B3 ..... 113.00
Sharon,Pa. S3 ..... 99.50
S.Chicago R2, U5, W14 .99.50
S.Duquesne,Pa. U5 .... 99.50
S.SanFrancisco B3.... 109.00
Warren,O. C17 ..... 99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32.. 119.00
Buffalo R2 ..... 119.00
Canton,O. R2, T7 .... 119.00
Conshohocken,Pa. A3.. 126.00
Detroit S41 ..... 119.00
Economy,Pa. B14 .... 119.00
Farrell,Pa. S3 ..... 119.00
Fontana,Calif. K1 .... 140.00
Gary,Ind. U5 ..... 119.00
Houston S5 ..... 124.00
Ind.Harbor,Ind. Y1 .. 119.00
Johnstown,Pa. B2 .... 119.00
Lackawanna,N.Y. B2.. 119.00
LosAngeles B3 ..... 139.00
Lowellville,O. S3 .... 119.00
Massillon,O. R2 ..... 119.00
Midland,Pa. C18 .... 119.00
Munhall,Pa. U5 ..... 119.00
Owensboro,Ky. G8 .... 119.00
Sharon,Pa. S3 ..... 119.00
S.Chicago R2,U5,W14.. 119.00
S.Duquesne,Pa. U5 .. 119.00
Struthers,O. Y1 ..... 119.00
Warren,O. C17 ..... 119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 .....$122.50
Canton,O. R2 ..... 125.00
Cleveland R2 ..... 122.50
Gary,Ind. U5 ..... 122.50
S.Chicago,Ill. R2, W14 .122.50
S.Duquesne,Pa. U5 .. 122.50
Warren,O. C17 ..... 122.50

SKELP
Aliquippa,Pa. J5 ..... 5.05
Munhall,Pa. U5 ..... 5.05
Pittsburgh J5 ..... 5.05
Warren,O. R2 ..... 5.05
Youngstown R2, U5 .... 5.05

WIRE RODS
AlabamaCity,Ala. R2 .. 6.40
Aliquippa,Pa. J5 ..... 6.40
Alton,Ill. L1 ..... 6.60
Bartonville,Ill. K4 .... 6.50
Buffalo W12 ..... 6.40
Cleveland A7 ..... 6.40
Donora,Pa. A7 ..... 6.40
Fairfield,Ala. T2 ..... 6.40
Houston S5 ..... 6.65
IndianaHarbor,Ind. Y1.. 6.40
Johnstown,Pa. B2 .... 6.40
Joliet,Ill. A7 ..... 6.40
KansasCity,Mo. S5 .... 6.65
Kokomo,Ind. C16 .... 6.50
LosAngeles B3 ..... 7.20
Minnequa,Colo. C10 .... 6.65
Monessen,Pa. P7 ..... 6.40
N.Tonawanda,N.Y. B11.. 6.40
Pittsburg,Calif. C11 .... 7.20
Portsmouth,O. P12 .... 6.40
Roebling,N.J. R5 ..... 6.50
S.Chicago,Ill. R2, W14.. 6.40
SparrowsPoint,Md. B2 .. 6.50
Sterling,Ill.(1) N15 .... 6.40
Sterling,Ill. N15 ..... 6.50
Struthers,O. Y1 ..... 6.40
Worcester,Mass. A7 .... 6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ..5.50
Aliquippa,Pa. J5 .....5.50
Atlanta A11 .....5.70
Bessemer,Ala. T2 .....5.50
Bethlehem,Pa. B2 .....5.55
Birmingham C15 .....5.50
Clairton,Pa. U5 .....5.50
Fairfield,Ala. T2 .....5.50
Fontana,Calif. K1 .....6.30
Gary,Ind. U5 .....5.50
Geneva,Utah C11 .....5.50
Houston S5 .....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 .....5.55
Joliet,Ill. P22 .....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 .....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 .....5.50
Niles,Calif. P1 .....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg.O4 .....6.25
Seattle B3 .....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 .....6.15
Sterling,Ill. N15 .....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 .....5.50

Wide Flange
Bethlehem,Pa. B2 .....5.55
Clairton,Pa. U5 .....5.50
Fontana,Calif. K1 .....6.45
IndianaHarbor,Ind. I-2..5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 .....5.50
Sterling,Ill. N15 .....5.50
Weirton,W.Va. W6 .....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....6.90
Munhall,Pa. U5 .....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 .....8.05
Bessemer,Ala. T2 .....8.05
Bethlehem,Pa. B2 .....8.10
Clairton,Pa. U5 .....8.05
Fairfield,Ala. T2 .....8.05
Fontana,Calif. K1 .....8.85
Gary,Ind. U5 .....8.05
Geneva,Utah C11 .....8.05
Houston S5 .....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 .....8.10
KansasCity,Mo. S5 .....8.15
Lackawanna,N.Y. B2 ..8.10
Los Angeles B3 .....8.75
Munhall,Pa. U5 .....8.05
Seattle B3 .....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 .....7.75
Struthers,O. Y1 .....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 .....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 .....8.05
S.Chicago,Ill. U5 .....8.05
Sterling,Ill. N15 .....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 .....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ..5.55
Munhall,Pa. U5 .....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ..6.50
Munhall,Pa. U5 .....6.50
S.Chicago,Ill. I-2, U5 ..6.50
Weirton,W.Va. W6 .....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 .....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 .....5.50
Bessemer,Ala. T2 .....5.30
Clairton,Pa. U5 .....5.30
Claymont,Del. C22 .....5.30
Cleveland J5, R2 .....5.30
Coatesville,Pa. L7 .....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 .....5.30
Fairfield,Ala. T2 .....5.30
Farrell,Pa. S3 .....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 .....5.30
Geneva,Utah C11 .....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 .....5.30
Houston S5 .....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 .....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 .../.....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 .....5.30
Newport,Ky. A2 .....5.30
Pittsburgh J5 .....5.30
Riverdale,Ill. A1 .....5.30
Seattle B3 .....6.20
Sharon,Pa. S3 .....5.30
S.Chicago,Ill. U5, W14..5.30
SparrowsPoint,Md. B2..5.30
Sterling,Ill. N15 .....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 .....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 .....7.05
Houston S5 .....7.15
Johnstown,Pa. B2 .....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 .....13.55

PLATES, H.S., L.A.
Aliquippa,Pa. J5 .....7.95
Ashland,Ky. A10 .....7.95
Bessemer,Ala. T2 .....7.95
Clairton,Pa. U5 .....7.95
Claymont,Del. C22 .....7.95
Cleveland J5, R2 .....7.95
Coatesville,Pa. L7 .....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 .....7.95
Ecorse,Mich. G5 .....7.95
Fairfield,Ala. T2 .....7.95
Farrell,Pa. S3 .....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 .....7.95
Geneva,Utah C11 .....7.95
Houston S5 .....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 .....7.95
Munhall,Pa. U5 .....7.95
Pittsburgh J5 .....7.95
Seattle B3 .....8.85
Sharon,Pa. S3 .....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Warren,O. R2 .....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 .....7.50
Claymont,Del. C22 .....7.50
Coatesville,Pa. L7 .....7.50
Economy,Pa. B14 .....7.50
Farrell,Pa. S3 .....7.50
Fontana,Calif. K1 .....8.30
Gary,Ind. U5 .....7.50
Houston S5 .....7.60
Ind.Harbor,Ind. Y1 .....7.50
Johnstown,Pa. B2 .....7.50
Lowellville,O. S3 .....7.50
Munhall,Pa. U5 .....7.50
Newport,Ky. A2 .....7.50
Pittsburgh J5 .....7.50
Seattle B3 .....8.40
Sharon,Pa. S3 .....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2..7.50
Youngstown Y1 .....7.50

FLOOR PLATES
Cleveland J5 .....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
S.Chicago,Ill. U5 .....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ..5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 .....6.05
Warren,O. c.l. R2 .....6.05

BARS

BARS, Hot-Rolled Carbon
(Merchant Quality)
Ala.City,Ala.(9) R2 ..5.675
Aliquippa,Pa. (9) J5 ..5.675
Alton,Ill. L1 .....5.875
Atlanta(9) A11 .....5.875
Bessemer,Ala.(9) T2 ..5.675
Birmingham(9) C15 ..5.675
Buffalo(9) R2 .....5.675
Canton,O.(23) R2 .....6.15
Clairton,Pa.(9) U5 ....5.675
Cleveland(9) R2 .....5.675
Ecorse,Mich(9) G5 ....5.675
Emeryville,Calif. J7 ....6.425
Fairfield,Ala.(9) T2 ..5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 .....5.675
Houston(9) S5 .....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 .....5.675
LosAngeles(9) B3 .....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ....6.125
Niles,Calif. P1 .....6.375
N.T'wan'a,N.Y.(23)B11 6.025
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11..6.375
Pittsburgh(9) J5 .....5.675
Portland,Oreg. O4 .....6.425
Riverdale,Ill.(9) A1 ..5.675
Seattle B3, N14 .....6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5 ..5.675
S.SanFran.,Calif.(9) B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ....5.775
Struthers,O.(9) Y1 .....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11. 6.375
Warren,O. C17 .....6.025
Youngstown(9) R2, U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.725
Bethlehem,Pa. B2 .....6.725
Bridgeport,Conn. C32 .. 6.80
Buffalo R2 .....6.725
Canton,O. R2, T7 .....6.725
Clairton,Pa. U5 .....6.725
Detroit S41 .....6.725
Economy,Pa. B14 .....6.725
Ecorse,Mich. G5 .....6.725
Fairless,Pa. U5 .....6.875
Farrell,Pa. S3 .....6.725
Fontana,Calif. K1 .....7.775
Gary,Ind. U5 .....6.725
Houston S5 .....6.975
Ind.Harbor,Ind. I-2, Y1..6.725
Johnstown,Pa. B2 .....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2..6.725
LosAngeles B3 .....7.775
Lowellville,O. S3 .....6.725
Massillon,O. R2 .....6.725
Midland,Pa. C18 .....6.725
Owensboro,Ky. G8 .....6.725
Pittsburgh J5 .....6.725
Sharon,Pa. S3 .....6.725
S.Chicago R2, U5, W14 6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 .....6.725
Warren,O. C17 .....6.725
Youngstown U5 .....6.725

BARS & SMALL SHAPES, H.R.
High-Strength, Low-Alloy
Aliquippa,Pa. J5 .....8.30
Bessemer,Ala. T2 .....8.30
Bethlehem,Pa. B2 .....8.30
Clairton,Pa. U5 .....8.30
Cleveland R2 .....8.30
Ecorse,Mich. G5 .....8.30
Fairfield,Ala. T2 .....8.30
Fontana,Calif. K1 .....9.00
Gary,Ind. U5 .....8.30
Houston S5 .....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 .....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 .....9.00
Pittsburgh J5 .....8.30
Seattle B3 .....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Struthers,O. Y1 .....8.30
Youngstown U5 .....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 .....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 .....5.675
Sterling,Ill. N15 .....5.775
Sterling,Ill.(1) N15 ..5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 .....5.675
Atlanta A11 .....5.875
Joliet,Ill. P22 .....5.675
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SanFrancisco S7 .....6.52
Seattle B3 .....6.425

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 .....6.80
Clairton,Pa. U5 .....6.80
Gary,Ind. U5 .....6.80
Houston S5 .....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 .....6.80
Youngstown U5 .....6.80

BARS, C.F. Loaded
(Including loaded extra)
Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ..10.175
BeaverFalls,Pa. M12 ..10.175
Camden,N.J. P13 ....10.35
Chicago W18 .....10.175
Elyria,O. W8 .....10.175
Monaca,Pa. S17 .....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.05c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 .....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 .....8.25
Buffalo B5 .....7.70
Camden,N. J. P13 .....8.10
Carnegie,Pa. C12 .....7.65
Chicago W18 .....7.65
Cleveland A7, C20 .....7.65
Detroit B5, P17 .....7.85
Detroit S41 .....7.65
Donora,Pa. A7 .....7.65
Elyria,O. W8 .....7.65
FranklinPark,Ill. N5 ..7.65
Gary,Ind. R2 .....7.65
GreenBay,Wis. F7 .....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 .....8.15
Harvey,Ill. B5 .....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B2 ....8.20
Massillon,O. R2, R8 ...7.65
Midland,Pa. C18 .....7.65
Monaca,Pa. S17 .....7.65
Newark,N. J. W18 .....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 .....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 .....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 .....7.65
SpringCity,Pa. K3 .....8.10
Struthers,O. Y1 .....7.65
Warren,O. C17 .....7.65
Waukegan,Ill. A7 .....7.65
Willimantic,Conn. J5 ...8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon
(Turned and Ground)
Cumberland,Md. (5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 .....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 .....9.025
Camden,N.J. P13 .....9.20
Canton,O. T7 .....9.025
Carnegie,Pa. C12 .....9.025
Chicago W18 .....9.025
Cleveland A7, C20 .....9.025
Detroit B5, P17 .....9.225
Detroit S41 .....9.025
Donora,Pa. A7 .....9.025
Elyria,O. W8 .....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 .....9.025
GreenBay,Wis. F7 .....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 .....9.325
Harvey,Ill. B5 .....9.025
Lackawanna,N.Y. B2 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ...9.025
Midland,Pa. C18 .....9.025
Monaca,Pa. S17 .....9.025
Newark,N.J. W18 .....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 .....9.025
SpringCity,Pa. K3 .....9.20
Struthers,O. Y1 .....9.025
Warren,O. C17 .....9.025
Waukegan,Ill. A7 .....9.025
Willimantic,Conn. J5 ...9.325
Worcester,Mass. A7 ....9.325
Youngstown F3, Y1 ....9.025

BARS, Reinforcing, Billet (To Fabricators)

Alabama City, Ala. R2 ..5.675
Atlanta A11 .....5.675
Birmingham C15 .....5.675
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse, Mich. G5 .....5.675
Emeryville, Calif. J7 ..6.425
Fairfield, Ala. T2 .....5.675
Fairless, Pa. U5 .....5.825
Fontana, Calif. K1 ....6.375
Ft. Worth, Tex (4) (26) T4 5.925
Gary, Ind. U5 .....5.675
Houston S5 .....5.925
Ind. Harbor, Ind. I-2, Y1 5.675
Johnstown, Pa. B2 ....5.675
Joliet, Ill. P22 .....5.675
Kansas City, Mo. S5 ..5.925
Kokomo, Ind. C16 .....5.775
Lackawanna, N.Y. B2 ..5.675
Los Angeles B3 .....6.375
Madison, Ill. L1 .....5.875
Milton, Pa. M18 .....5.825
Minnequa, Colo. C10 ...6.125
Niles, Calif. P1 .....6.375
Pittsburg, Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland, Oreg. O4 ....6.425
Sand Springs, Okla. S5 ..5.925
Seattle B3, N14 .....6.425
S. Chicago, Ill. R2, W14 5.675
S. Duquesne, Pa. U5 ...5.675
S. San Francisco B3 ....6.425
Sparrows Point, Md. B2 ..5.675
Sterling, Ill. (1) N15 ...5.675
Sterling, Ill. N15 .....5.775
Struthers, O. Y1 .....5.675
Tonawanda, N.Y. B12 ...6.10
Torrance, Calif. C11 ....6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown, Pa. B2 ....7.33
Kansas City, Mo. S5 ....7.60
Lackawanna, N.Y. B2 ...7.35
Marion, O. P11 .....6.70
Newark, N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.25
Sand Springs, Okla. S5 ..7.60
Seattle B3, N14 .....7.95
Sparrows Pt., Md. B2 ...7.33
St Paul U8 .....8.17
Williamsport, Pa. S19 ..7.25

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 14.90
Economy, Pa. (D.R.) B14 18.55
Economy (Staybolt) B14 19.00
McK. Rks. (S.R.) L5 ...14.50
McK. Rks. (D.R.) L5 ..19.80
McK. Rks. (Staybolt) L5 20.95

BARS, Rail Steel

Chicago Hts. (3) C2, I-2 5.575
Chicago Hts. (4) (44) I-2 5.675
Chicago Hts. (4) C2 ....5.675
Franklin, Pa. (3) F5 ...5.575
Franklin, Pa. (4) F5 ....5.675
Jersey Shore, Pa. (3) J8 ..5.55
Marion, O. (3) P11 ....5.575
Tonawanda (3) B12 ....5.575
Tonawanda (4) B12 ....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Lackawanna, N.Y. B2 ..5.10
Allenport, Pa. P7 .....5.10
Aliquippa, Pa. J5 .....5.10
Ashland, Ky. (8) A10 ...5.10
Cleveland J5, R2 .....5.10
Conshohocken, Pa. A3 ..5.15
Detroit (8) M1 .....5.10
Ecorse, Mich. G5 .....5.10
Fairfield, Ala. T2 .....5.10
Fairless, Pa. U5 .....5.15
Farrell, Pa. S3 .....5.10
Fontana, Calif. K1 .....5.825
Gary, Ind. U5 .....5.10
Geneva, Utah C11 .....5.20
Granite City, Ill. (8) G4 ..5.20
Ind. Harbor, Ind. I-2, Y1 5.10
Irvin, Pa. U5 .....5.10
Lackawanna, N.Y. B2 ..5.10
Mansfield, O. E6 .....5.10
Munhall, Pa. U5 .....5.10
Newport, Ky. A2 .....5.10
Niles, O. M21, S3 .....5.10
Pittsburg, Calif. C11 ..5.80
Pittsburgh J5 .....5.10
Portmsouth, O. P12 .....5.10
Riverdale, Ill. A1 .....5.10
Sharon, Pa. S3 .....5.10
S. Chicago, Ill. U5, W14 ..5.10
Sparrows Point, Md. B2 ..5.10
Steubenville, O. W10 ....5.10
Warren, O. R2 .....5.10
Weirton, W.Va. W6 ....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary, Ind. U5 .....8.40
Ind. Harbor, Ind. Y1 ....8.40
Irvin, Pa. U5 .....8.40
Munhall, Pa. U5 .....8.40
Newport, Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa, Pa. J5 .....7.525
Ashland, Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken, Pa. A3 ..7.575
Ecorse, Mich. G5 .....7.525
Fairfield, Ala. T2 .....7.525
Fairless, Pa. U5 .....7.575
Farrell, Pa. S3 .....7.525
Fontana, Calif. K1 .....8.25
Gary, Ind. U5 .....7.525
Ind. Harbor, Ind. I-2, Y1 7.525
Irvin, Pa. U5 .....7.525
Lackawanna (35) B2 ...7.525
Munhall, Pa. U5 .....7.525
Niles, O. S3 .....7.525
Pittsburgh J5 .....7.525
S. Chicago, Ill. U5, W14 .7.525
Sharon, Pa. S3 .....7.525
Sparrows Point (36) B2 ..7.525
Warren, O. R2 .....7.525
Weirton, W.Va. W6 ....7.525
Youngstown U5, Y1 ....7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ...5.35
Cleveland R2 .....5.875
Warren, O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown, O. A10 ....6.775
Warren, O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

Alabama City, Ala. R2 ..6.275
Allenport, Pa. P7 .....6.275
Aliquippa, Pa. J5 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken, Pa. A3 ..6.375
Detroit M1 .....6.275
Ecorse, Mich. G5 .....6.275
Fairfield, Ala. T2 .....6.275
Fairless, Pa. U5 .....6.325
Follansbee, W.Va. F4 ..6.275
Fontana, Calif. K1 .....7.40
Gary, Ind. U5 .....6.275
Granite City, Ill. G4 ....6.375
Ind. Harbor, Ind. I-2, Y1 6.275
Irvin, Pa. U5 .....6.275
Lackawanna, N.Y. B2 ..6.275
Mansfield, O. E6 .....6.275
Middletown, O. A10 ....6.275
Newport, Ky. A2 .....6.275
Pittsburg, Calif. C11 ...7.225
Pittsburgh J5 .....6.275
Portsmouth, O. P12 .....6.275
Sparrows Point, Md. B2 ..6.275
Steubenville, O. W10 ...6.275
Warren, O. R2 .....6.275
Weirton, W.Va. W6 ....6.275
Yorkville, O. W10 .....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa, Pa. J5 ....9.275
Cleveland J5, R2 ....9.275
Ecorse, Mich. G5 .....9.275
Fairless, Pa. U5 .....9.325
Fontana, Calif. K1 ....10.40
Gary, Ind. U5 .....9.275
Ind. Harbor, Ind. I-2, Y1 9.275
Lackawanna (37) B2 ..9.275
Pittsburgh J5 .....9.275
Sparrows Point (38) B2 ..9.275
Warren, O. R2 .....9.275
Weirton, W.Va. W6 ...9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala. City, Ala. R2	7.225	....
Ashland, Ky. A10	7.225	7.475
Canton, O. R2	7.225	7.75
Fairfield T2	7.225	7.4.5
Gary, Ind. U5	7.225	7.475
Granite City, Ill. G4	7.325	....
Ind. Harbor I-2	7.225	7.475
Irvin, Pa. U5	7.225	7.475
Kokomo, Ind. C16	7.325	....
Martins Fry. W10	7.2.5	7.475
Pitts., Calif. C11	7.975	....
Sparrows Pt. B2	7.225	....
Pittsburgh J5	7.225	....

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

Alabama City, Ala. R2 .6.875‡
Ashland, Ky. A10 ....6.875†
Canton, O. R2 .....6.875‡
Dover, O. E6 .....6.875†
Fairfield, Ala. T2 ....6.875†
Gary, Ind. U5 .....6.875†
Granite City, Ill. G4 ...6.975*
Ind. Harbor, Ind. I-2 ..6.875†
Irvin, Pa. U5 .....6.875†
Kokomo, Ind. C16 ....6.975‡
Martins Ferry, O. W10 .6.875*
Middletown, O. A10 ...6.875†
Pittsburg, Calif. C11 ..7.625*
Pittsburgh J5 .....6.875†
Sparrows Pt., Md. B2 ..6.875†
Warren, O. R2 .....6.875†
Weirton, W.Va. W6 ...6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin, Pa. U5 .....10.125
Pittsburgh J5 .....10.125
Sparrows Pt. (39) B2 ..10.025

SHEETS, Galvannealed Steel

Canton, O. R2 .....7.275
Irvin, Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland, Ky. A10 .....7.125
Middletown, O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.65
Niles, O. (28) R2 .....7.65
Weirton, W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 9.525
Butler, Pa. A10 (type 2) 9.625

SHEETS, Enameling Iron

Asland, Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield, Ala. T2 .....6.775
Gary, Ind. U5 .....6.775
Granite City, Ill. G4 ....6.875
Ind. Harbor, Ind. I-2, Y1 6.775
Irvin, Pa. U5 .....6.775
Middletown, O. A10 ....6.775
Niles, O. M21, S3 .....6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover, O. E6 .....8.70
Follansbee, W.Va. F4 ...8.70
Ind. Harbor, Ind. I-2 ....8.70
Mansfield, O. E6 .....8.70
Warren, O. R2 .....8.70
Yorkville, O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

Beech Bottom, W.Va. W10 7.225
Gary, Ind. U5 .....7.225
Mansfield, O. E6 .....7.225
Middletown, O. A10 ....7.225
Niles, O. M21, S3 .....7.225
Warren, O. R2 .....7.225
Weirton, W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.625

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co., Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas & Fuel Assoc.
E2 Eastern Stainless Steel
E5 Elliott Bros. Steel Co.
E6 Empire-Reeves Steel Corp.
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Div., Merritt-Chapman & Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S. & W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring Corp.
W2 Wallingford Steel Corp.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton, Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Buffalo(27) R2	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle (25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2,Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. F4	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, E5	7.425
NewHaven, Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3	7.975
Pawtucket,R.I. N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Wallingford,Conn. W2	7.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Carnegie,Pa. S18	15.55
Cleveland A7	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. C18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41, Y1	7.425

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	8.95	10.40	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, E5	8.95	10.40	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	9.85	10.40	12.60	15.60	....
New York W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y.(32) R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Wallingford,Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	18.85	22.95	27.80
Buffalo W12	18.85	....	....
Fostoria,O. S1	19.05	22.15	....
FranklinPark,Ill. T6	19.20	23.30	28.15
Harrison,N.J. C18	18.85	22.95	27.80
New York W3	18.85	22.95	27.80
Palmer,Mass. W12	18.85	....	....
Trenton,N.J. R5	18.85	22.95	27.80
Worcester,Mass. A7, T6	18.85	22.95	27.80
Youngstown S41	19.20	23.30	28.15

Weirton,W.Va. W6 ....10.80
Youngstown Y1 .....10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2 .....8.175

STRIP, C.R. Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.60
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa.J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fairless,Pa. U5	10.50	10.75
Fontana,Calif.K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harb. Y1	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va.W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.25
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.55	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)	T-72	T-65	T-58	T-52
Fully Processed (Semiprocessed ½c lower)				
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

	Grain Oriented				
C.R. COILS & CUT LENGTHS (22 Ga.)	T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	19.70	20.20	20.70	....
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity, Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
N.Tonawanda,N.Y. B11	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFrancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Muncie,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling,N.J. R5	12.95
SparrowsPt.,Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W2	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4,T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Milbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Muncie,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C10	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
KansasCity,Mo. U3	13.70
Johnstown,Pa. B2	13.45
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	11.65
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	11.95
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburgh,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb keg) To Dealers (33)

Wheeling,W.Va. W10	$9.80

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	177
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill. (7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.)per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$9.24
Atlanta A11	10.36
Bartonville,Ill. K4	9.34
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	9.34
Donora,Pa. A7	9.24
Duluth A7	9.24
Fairfield,Ala. T2	9.24
Houston S5	10.51
Jacksonville,Fla. M8	9.34
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	9.24
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	9.34
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	9.94
S.Chicago,Ill. R2	9.24
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill. (37) N15	9.24

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.54
Atlanta A11	10.70
Bartonville,Ill. K4	9.64
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.64
Donora,Pa. A7	9.54
Duluth A7	9.54
Fairfield,Ala. T2	9.54
Houston S5	10.85
Jacksonville,Fla. M8	9.64
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	9.54
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.64
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	10.26
S.Chicago,Ill. R2	9.54
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill. (37) N15	9.54

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.59
Atlanta A11	10.75
Bartonville,Ill. K4	9.69
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.69
Donora,Pa. A7	9.59
Duluth A7	9.59
Fairfield,Ala. T2	9.59
Houston S5	10.90
Jacksonville,Fla. M8	9.69
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	9.59
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	9.69
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.59
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	9.59

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198§
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196§
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198††

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-11½ga.J5	190§
Atlanta A11	192§
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192††

WIRE (16 gage)

	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.85	19.40**
Aliq'ppa,Pa. J5	.17.85	19.65
Bartonville K4	.17.95	19.80
Cleveland A7	.17.85	
Craw'dville M8	17.95	19.80‡‡
Fostoria,O. S1	.18.35	19.90†
Houston S5	.18.10	19.65**
Jacksonville M8	17.95	19.80‡‡
Johnstown B2	.17.85	19.65§
Kan.City,Mo. S5	.18.10	
Kokomo C16	.17.25	18.80†
Minnequa C10	.18.10	19.65**
P'lm'r.Mass.W12	18.15	19.70†
Pitts.,Calif. C11	18.20	19.75†
S.SanFran. C10	18.20	19.75**
Sterling(37)N15	17.25	19.05††
SparrowsPt. B2	.17.95	19.75§
Waukegan A7	.17.85	19.40†
Worcester A7	.18.15	

WIRE, Merchant Quality (6 to 8 gage)

	An'ld	Galv.
Ala.City,Ala. R2	.9.00	9.55**
Aliquippa J5	.8.65	9.325§
Atlanta(48) A11	.9.10	9.775§
Bartonville(48) K4	.9.10	9.80
Buffalo W12	.9.00	9.55†
Cleveland A7	.9.00	
Crawfordsville M8	9.10	9.80‡‡
Donora,Pa. A7	.9.00	9.55†
Duluth A7	.9.00	9.55†
Fairfield T2	.9.00	9.55†
Houston(48) S5	.9.25	9.80**
Jack'ville,Fla. M8	9.10	9.80‡‡
Johnstown B2(48)	9.00	9.675§
Joliet,Ill. A7	.9.00	9.55†
Kans.City(48) S5	.9.25	9.80**
Kokomo(48) S16	.9.10	9.65†
LosAngeles B3	.9.95	10.625§
Monessen(48) P7	.8.65	9.35§
Palmer,Mass. W12	.9.30	9.85†
Pitts.,Calif. C11	.9.95	10.50†
Rankin,Pa. A7	.9.00	9.55†
S.Chicago R2	.9.00	9.55**
S.SanFran. C10	.9.95	10.50**
Spar'wsPt.(48)B2	9.10	9.775§
St'ling(1)(48)N15	9.00	9.70§§
Struthers,O. Y1	.9.00	9.65‡
Worcester,Mass.A7	9.30	9.85†

Based on zinc price of: *13.50. †5c. §10c. ‡Less than 10c. ††10.50c. ‡‡11.00c. **Subject to zinc equalization extras. §§11.50c.

FASTENERS

(Base discounts, shipments of one to four containers, per cent off list, f.o.b. mill)

BOLTS

Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0
Longer than 6 in.	37.0
⅝ in., 3 in. & shorter	47.0
3¼ in. thru 6 in.	40.0
Longer than 6 in.	31.0
¾ in. thru 1 in.:	
6 in. and shorter	37.0
Longer than 6 in.	31.0
1¼ in. and larger:	
All lengths	31.0

Undersize Body (rolled thread)

½ in. and smaller:	
3 in. and shorter	55.0
3¼ in. thru 6 in.	50.0

Carriage Bolts
Full Size Body (cut thread)& Undersize Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

Lag, Plow, Tap, Blank, Step, Elevator, Tire, and Fitting Up Bolts

½ in. and smaller:	
6 in. and shorter	48.0
Larger diameters and longer lengths	35.0

High Tensile Structural Bolts (Reg. semifinished hex head bolts, heavy semifinished hex nuts. Bolts — High-carbon steel, heat treated, Spec. ASTM A-325, in bulk. Full keg quantity)

⅝ in. diam.	50.0
¾ in. diam.	47.0
⅞ and 1 in. diam.	43.0
1⅛ and 1¼ in. diam.	34.0

NUTS

(Keg or case quantity and over)

Square Nuts, Reg. & Heavy:

All sizes	56.0

(Full container)

Hex Nuts, Reg. & Heavy Hot Pressed & Cold Punched:

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

¾ in. and smaller	62.0
⅞ in. to 1½ in., incl.	56.0
1⅝ in. and larger	51.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

⅞ in. and smaller	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅝ in. and smaller	62.0
¾ in. to ⅞ in., incl.	65.0
1 in. to 1½ in., incl.	57.0
1⅝ in. and larger	51.5

CAP AND SETSCREWS (Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:
6 in. and shorter:

⅝ in. and smaller	35.0
¾, ⅞, and 1 in.	16.0
Longer than 6 in.:	
⅝ in. and smaller	3.0
¾, ⅞, and 1 in.	+11.0

High Carbon, Heat Treated:
6 in. and shorter:

⅝ in. and smaller	20.0
¾, ⅞, and 1 in.	+ 5.0
Longer than 6 in.:	
⅝ in. and smaller	+19.0
¾, ⅞, and 1 in.	+39.0

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter	+85.0

Setscrews, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:

6 in. and shorter	+ 5.0
Longer than 6 in.	+29.0

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½ in., larger 12.85
7/16 in. and smaller by 6 in. and shorter: 15.0%.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches				
	1/4	5/16	3/8	7/16	1/2
Alton,Ill. L1	$28.95	$43.40	$55.40	$73.00	$95.10
Buffalo W12	28.95	43.40	55.40	73.00	95.10
Cleveland A7	28.95	43.40	55.40	73.00	....
KansasCity,Mo. U3	29.85	43.40	55.40	73.00	95.10
Monessen,Pa. P16	32.15	48.20	61.55	81.10	105.65
NewHaven,Conn. A7	28.95	43.40	55.40	73.00	95.10
Pittsburg,Calif. C11	....	43.40	55.40	73.00	....
Pueblo,Colo. W12	28.95	43.40	55.40	73.00	95.10
Roebling,N.J. R5	28.95	43.40	55.40	73.00	95.10
SparrowsPoint,Md. B2	28.95	43.40	55.40	73.00	95.10
St.Louis L8	28.95	43.40	55.40	73.00	95.10
Waukegan,Ill. A7	28.95	43.40	55.40	73.00	95.10

RAILWAY MATERIALS

	Standard		Too Rails	
Rails	No. 1	No. 2	All No. 2	60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnston,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	6.875

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minnequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh P14	14.75
Seattle B3	15.85

SCREW SPIKES

Lebanon,Pa. B2	15.10

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2,Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 6.295c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.635c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25
Youngstown Y1	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+27.25	+5.75	+22.5	+3.25	+20	+1.75	+18.5	+1.75	+18.5	+2	+18.75	0.5	+16.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	¼		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Alton, Ill. L1	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Benwood, W. Va. W10	1.5	+25	+10.5	+34	+21	+42.5	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Butler, Pa. F6	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+26	+7.75	+22	+4.25	+17.5	+1.75	+16.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+14	4.25	+10	7.75	+5.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sharon, Pa. S4	4.5	+22	+8.5	+32	+19.5	+41	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Sparrows Pt., Md. B2	2.5	+24	+10.5	+34	+21.5	+43	0.25	+15	3.25	+11	6.75	+6.5	9.25	+5.75
Wheatland, Pa. W9	4.5	+22	+8.5	+32	+19.5	+41	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+13	5.25	+9	8.75	+4.5	11.25	+3.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.72		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Alton, Ill. L1	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Benwood, W. Va. W10	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Etna, Pa. N2	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Fairless, Pa. N3	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+5.5	1.25	+15.5	1.25	+15.5
Fontana, Calif. K1	+1.25	+15.75	+0.75	+15.25	0.75	+15.5	0.75	+15.5	+9.75	+26.5	+9.75	+26.5
Indiana Harbor, Ind. Y1	10.75	+3.75	11.25	+3.25	12.75	+3.5	12.25	+3.5	2.25	+14.5	2.25	+14.5
Lorain, O. N3	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+4.75	10.25	+4.25	11.75	+4.5	11.75	+4.5	1.25	+15.5	1.25	+15.5
Wheatland, Pa. W9	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5
Youngstown R2, Y1	11.75	+2.75	12.25	+2.25	13.75	+2.5	13.75	+2.5	3.25	+13.5	3.25	+13.5

*Galvanized pipe discounts based on price of zinc at 11.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	28.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	31.50	37.75	39.00	42.25	44.50	40.00	49.25	49.25
301	24.00	29.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	32.75	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	34.00	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	34.50	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	38.25	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	39.75	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	51.25	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	63.75	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	51.25	64.50	68.50	71.75	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	62.25	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	41.50	48.75	53.50	54.50	57.50	54.75	65.50	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	22.25	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	34.75	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	22.50	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co.; Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary, Allegheny Ludlum Steel Corp.; Washington Steel Corp. Seymour Mfg. Co.

Clad Steel

Stainless	—Plates— 5%	Carbon Base 10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	63.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	$35.85	$42.50

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3, nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	W-Cr Hot Work (H-12)	0.530
Spec. Carbon (W-1)	0.385	W Hot Wk. (H-21)	1.425-1.44
Oil Hardening (O-1)	0.565	V-Cr Hot Work (H-13)	0.550
V-Cr Hot Work (H-11)	0.505	Hi-Carbon-Cr (D-11)	0.955

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	....	T-1	1.840
18	4	2	....	....	T-2	2.005
13.5	4	3	....	....	T-3	2.105
18.25	4.25	1	4.75	....	T-4	2.545
18	4	2	9	....	T-5	2.915
20.25	4.25	1.6	12.95	....	T-6	4.330
13.75	3.75	2	5	....	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward, Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N. Tonawanda, N.Y. T9	....	66.50	67.00	67.50
Tonawanda, N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester, N.Y., deld.	69.02	69.52	70.02	....
Syracuse, N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S. Chicago, Ill. R2	66.00	66.50	66.50	67.00
S. Chicago, Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon, Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron, Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro, Pa. B10	68.00	68.50	69.00	69.50
Chester, Pa. P4	68.00	68.50	69.00	....
Swedeland, Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.50	76.00	....
Newark, N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy, N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
Neville Island, Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKees Rocks, Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding, Monaca, Pa., deld.	....	68.26	68.26	68.79
Verona, Trafford, Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge, Pa., deld.	68.60	69.10	69.10	69.63
Midland, Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard, Ohio Y1	....	....	66.50	....
Sharpsville, Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield, Ohio, deld.	71.30	....	71.80	72.30
Dulutn I-3	66.00	66.50	66.50	67.00
Erie, Pa. I-3	66.00	66.50	66.50	67.00
Everett, Mass. E1	67.50	68.00	68.50	....
Fontana, Calif. K1	75.00	75.50	....	....
Geneva, Utah C11	66.00	66.50	....	....
Granite City, Ill. G4	67.90	68.40	68.90	....
Ironton, Utah C11	66.00	66.50	....	....
Minnequa, Colo. C10	68.00	68.50	69.00	....
Rockwood, Tenn. T3	....	62.50‡	66.50	....
Toledo, Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Managanese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson, Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Calvert City, Ky. P15	$99.00
Niagara Falls, N.Y. P15	99.00
Keokuk, Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk, Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$73.00
Rockwood, Tenn. T3 (Phos. 0.035% max)	73.00
Troy, N.Y. R2 (Phos. 0.035% max)	73.00
Philadelphia, deld.	81.67
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Steel Service Center Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Denver, Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Birmingham, Chattanooga, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††‡		Carbon	Floor
Atlanta	8.59§	9.86§	10.13	....	8.91	9.39	13.24#	....	9.40	9.29	11.21
Baltimore	8.55	9.25	9.99	....	9.05	9.45	11.85#	15.48	9.55	9.00	10.50
Birmingham	8.18	9.45	10.46	....	8.51	8.99	....	....	9.00	8.89	10.90
Boston	9.31	10.40	11.97	53.50	9.73	10.11	13.39#	15.71	10.01	10.02	11.85
Buffalo	8.40	9.60	10.85	56.98	8.75	9.15	11.45#	15.40	9.25	9.20	10.75
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.25	9.45	10.50	53.00	8.51	8.99	9.15	15.05	9.00	8.89	10.20
Cincinnati	8.43	9.51	10.95	53.43	8.83	9.31	11.53#	15.37	9.56	9.27	10.53
Cleveland	8.36	9.54	11.30	52.33	8.63	9.10	11.25#	15.16	9.39	9.13	10.44
Dallas	8.80	9.30	....	....	8.85	8.80	....	....	8.75	9.15	10.40
Denver	9.40	11.84	12.94	....	9.43	9.80	11.19	....	9.84	9.76	11.08
Detroit	8.51	9.71	11.25	56.50	8.88	9.30	9.51	15.33	9.56	9.26	10.46
Erie, Pa.	8.35	9.45	9.95[10]	....	8.60	9.10	11.25	....	9.35	9.10	10.60
Houston	8.40	8.90	10.29	52.00	8.45	8.40	11.60	15.75	8.35	8.75	10.10
Jackson, Miss.	8.52	9.79	....	....	8.84	9.82	10.68	....	9.33	9.22	11.03
Los Angeles	8.70[3]	10.80[3]	12.15[3]	57.60	9.15	9.10[3]	12.95[3]	16.35	9.00[3]	9.10[3]	11.30[3]
Memphis, Tenn.	8.59	9.80	....	....	8.84	9.32	11.25#	....	9.33	9.22	10.86
Milwaukee	8.39	9.59	11.04	....	8.65	9.13	9.39	15.19	9.22	9.08	10.34
Moline, Ill.	8.55	9.80	....	....	8.84	8.95	9.15	....	8.99	8.91	....
New York	9.17	10.49	11.10	53.08	9.64	9.99	13.25#	15.50	9.74	9.77	11.05
Norfolk, Va.	8.65	....	....	....	9.15	9.30	12.75	....	9.65	9.10	10.50
Philadelphia	8.20	9.25	10.61	52.71	9.25	9.40	11.95#	15.48	9.10	9.15	10.40**
Pittsburgh	8.35	9.55	10.90	52.00	8.61	8.99	11.25#	15.05	9.00	8.89	10.20
Richmond, Va.	8.65	....	10.79	....	9.15	9.55	....	....	9.65	9.10	10.60
St. Louis	8.63	9.83	11.28	....	8.89	9.37	9.78	15.43	9.48	9.27	10.58
St. Paul	8.79	10.04	11.49	....	8.84	9.21	9.86	....	9.38	9.30	10.49
San Francisco	9.65	11.10	11.40	55.10	9.75	10.15	13.00	16.00	9.85	10.00	12.35
Seattle	10.30	11.55	12.50	56.52	10.25	10.50	14.70	16.80[3]	10.20	10.10	12.50
South'ton, Conn.	9.07	10.33	10.71	....	9.48	9.74	....	....	9.57	9.57	10.91
Spokane	10.35	11.55	12.55	57.38	10.80	11.05	14.70	16.80	10.25	10.15	13.05
Washington	9.15	....	....	....	9.65	10.05	12.50	....	10.15	9.60	11.10

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡⅝ in. to 4 in. wide, inclusive; #net price, 1 in. round C-1018.

Base quantities, 2000 to 4999 lb except as noted: cold-finished bars, 2000 lb and over except in Seattle, 2000 to 3999 lb; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Seattle, 30,000 lb and over; [3]—30,000 lb; [5]—1000 to 4999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchens, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga, Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Curtner, Calif., $185; Canon City, Colo., $183.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merriil Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa.,$260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.60.

Magnesite (per net ton)

Domestic, dead - burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 sts.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $30-$33, contract; Mexican, all rail, duty paid, $25; barge, Brownsville, Tex., $27.

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish:	
98% Fe:	
F.o.b. Camden or Riverton, N. J., freight allowed east of Mississippi river, ocean bags, 23,000 lb and over	11.25
Sponge Iron, Domestic, 98% Fe:	
F.o.b. Riverton, N. J., freight allowed east of Mississippi River:	
100 mesh, 100 lb bags	11.25
100 mesh, 100 lb pails	9.10‡
40 mesh, 100 lb bags	8.10
Electrolytic Iron,	
Melting stock, 99.87% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.75
(In contract lots of 240 tons price is 22.75c)	
Annealed, 99.5% Fe	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 93.00-290.00 in standard 200-lb containers; all minus 200 mesh	
Aluminum:	
Atomized, 500-lb drum, freight allowed	
Carlots	38.50
Ton lots	40.50
Antimony, 500-lb lots	42.00*
Brass, 5000-lb lots	34.40-50.90†
Bronze, 5000-lb lots	52.20-56.20†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese, Electrolytic:	
Minus 50 mesh	43.00
Nickel	80.60
Nickel-Silver, 5000-lb lots	52.80-57.20†
Phosphor-Copper, 5000-lb lots	64.60
Copper (atomized) 5000-lb lots	45.10-53.60†
Solder	7.00*
Stainless Steel, 304	$0.89
Stainless Steel, 316	$1.07
Tin	14.00*
Zinc, 5000-lb lots	19.00-32.20‡
Tungsten:	Dollars
Carbon reduced, 98.8% min.minus 65 mesh	nom.**
1000 lb	2.80
less 1000 lb	2.95
Chromium, electrolytic 99.8% Cr, min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §Cutting and scarfing grade. **Depending on price of ore.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$64.00
2½	30	41.50
3	40	39.25
4	40	37.00
5⅛	40	36.50
6	60	33.25
7	60	29.75
8, 9, 10	60	29.50
12	72	28.25
14	60	28.25
16	72	27.25
17	60	27.25
18	72	27.00
20	72	26.50
24	84	27.25

CARBON

8	60	14.25
10	60	13.80
12	60	14.75
14	60	14.75
14	72	12.35
17	60	12.65
17	72	12.10
20	90	11.55
24	72, 84	11.95
24	96	12.10
30	84	12.00
35, 40	110	11.60
40	100	12.50

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries.)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.40	$5.40	$5.30	$5.75
Bar Size Angles	5.10	5.10	5.00	5.43
Structural Angles	5.10	5.10	4.90	5.43
I-Beams	5.06	5.06	4.96	5.40
Channels	5.06	5.06	4.96	5.40
Plates (basic bessemer)	6.62	6.62	6.62	6.94
Sheets, H.R.	8.20	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	8.75	8.75	8.75	9.12
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.76	25.64	25.64	26.51
Barbed Wire (†)	6.60	6.60	6.60	6.95
Merchant Bars	5.40	5.40	5.35	5.90
Hot-Rolled Bands	7.15	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	5.19	5.32	5.14	5.49
Wire Rods, O.H. Cold Heading Quality No. 5	5.09	6.22	6.04	6.34
Bright Common Wire Nails (§)	7.89	7.75	7.67	8.26

†Per 82 lb net reel. §Per 100-lb kegs, 20d nails and heavier.

Ores

Lake Superior Iron Ore

(Prices effective for the 1958 shipping season, gross ton, 51.50% iron natural rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	nom.

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	23.00
N. African hematite (spot)	nom.
Brazilian iron ore, 68.5%	22.60

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$10.75-11.00*
Domestic, concentrates f.o.b. milling points	16.00-17.00†

*Before duty. †Nominal.

Manganese Ore

Mn 46-48%, Indian (export tax included) $0.915-$0.965 per long ton unit, c.i.f. U. S. ports, duty for buyer's account; other than Indian, nominal; contracts by negotiation.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$42.00-44.00
48% 2.8:1	38.00-40.00
48% no ratio	29.00-31.00
South African Transvaal	
44% no ratio	19.75-21.00
48% no ratio	29.00-31.0C
Turkish	
48% 3:1	51.00-55.00
Domestic	
Rail nearest seller	
18% 3:1	39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f seaboard

50-55%	$2.25-2.40
60-65%	2.50-3.10

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens:	
New England, deld.	33.55*
Indianapolis, ovens	31.25
Ironton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.73
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Coal Chemicals

(Representative prices)

Cents per gal., f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	22.00
Naphthalene, 78 deg	5.00
Toluene, one deg (del. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, del.	
Phenol, 90 per cent grade	15.50
Per net ton bulk, f.o.b. cars or trucks, plant	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Neville Island, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $245, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Mn 79-81%). Lump $253 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.5% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.006% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn; packed, carload 26.8c, ton lot 28.4c, less ton 29.6c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, carload 45.75c, ton lot 47.25c, less ton lot. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, bulk, 33.25c; 2000 lb to min carload, 36c; less ton, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload, lump, bulk, 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $240 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $245.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $290 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $295.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c, less ton 33.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 36.75c per lb contained Cr; 0.010% max, 37.75c. Ton lot, add 3.5c; less ton, add 5.2c. Delivered.

Cr 67-71%, carload, lump, bulk, C 0.02% max, 41.00c per lb contained Cr; 0.025% max, 39.75c; 0.05% max, 39.00c; 0.10% max, 38.50c; 0.20% max, 38.25c; 0.50% max, 38.00c; 1.0% max, 37.75c; 1.5% max, 37.50c; 2.0% max, 37.25c. Ton lot, add 3.4c; less ton lot, add 5.1c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 61-66%, C 5-7%, Si 7-10%). Contract, c.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload packed, 8M x D, 21.25c per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max or Cr 33-36%, Si 45-48%, C 0.05% max. Carload, lump, bulk, 3" x down and 2" x down, 28.25c per lb contained Cr, 14.60c per lb contained Si, 0.75" x down 29.40c per lb contained Cr, 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed, 2" x D plate (about ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Contract, carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices. **65% Ferrosilicon:** Contract, carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 24.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing min 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Contract, lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, bags 16c; 3000 lb to c.l., pallets 16c; 2000 lb to c.l., bags 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, bags 16.3c, 3000 lb to c.l., pallets 16.3c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Contract, carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l.; bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb, f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Ton lots 2" x D, $4 per lb of contained Cb; less ton lots $4.05 (nominal). Delivered.

Ferrotantalum Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.80 per lb of contained Cb plus Ta, delivered; less ton lots $3.85 (nominal).

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed 1½-in. x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20c per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

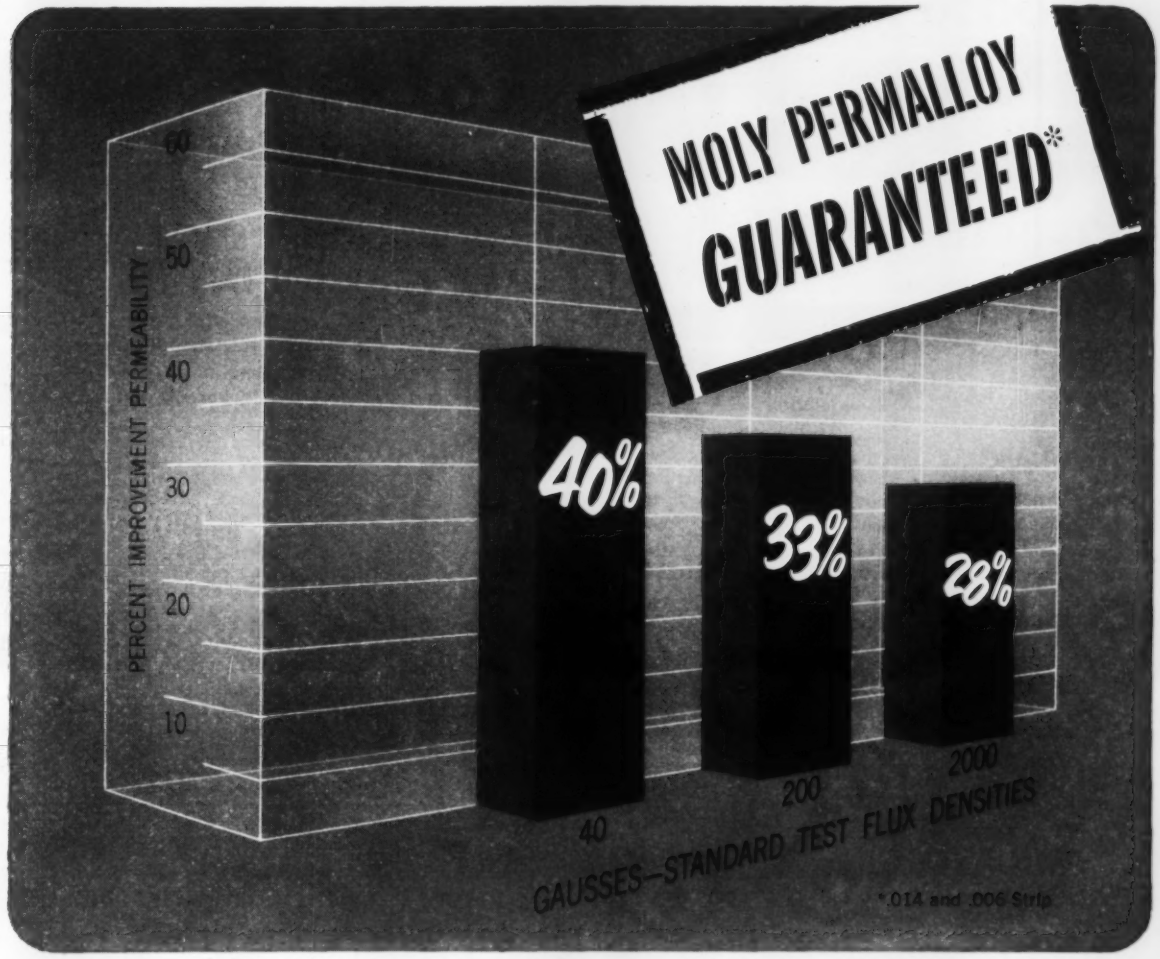
Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 19.25c. Packed c.l. 20.25c, 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $120 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.

Experience—*the added alloy in* ***A-L Stainless, Electrical and Tool Steels***



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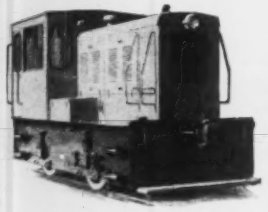

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Big Japanese Scrap Orders Pending

Negotiations for 900,000 tons to be exported over next six months put some life into the dealer market but fail to bolster prices. Composite slips 67 cents to $41.66

Scrap Prices, Page 166

New York—Japan is negotiating for about 900,000 tons of scrap for delivery over the next six months. Purchases of at least a portion of this tonnage are expected to be concluded shortly.

In all, about 100 cargoes, averaging 9000 tons each, are said to be under consideration.

District brokers have advanced their buying on low phos structurals and plates to $36-$37, No. 1 cupola to $36-$37, and heavy breakable cast to $34-$35, increases of $1 a ton in each instance.

Los Angeles — Purchase of 104 cargoes of scrap by Japan—half of which is expected to come from the West Coast—is having a firming effect on the local market. This, coupled with an increase in demand by domestic mills, has raised prices $2 to $5 a ton.

Seattle — Exporters are hoping that negotiations with Japanese steelmakers will result in active resumption of shipments.

Philadelphia—Activity on domestic account is slow, but processors are optimistic. Reason: Export markets are taking what they can't sell to area mills. One vessel is loading. Another is expected to start taking on cargo about March 20, and still another will load scrap early in April. Most of it is going to Japan.

Pittsburgh — Although steelmaking operations are climbing, mills are only moderately interested in scrap. Brokers say the mills aren't buying because: 1. They're relying heavily on blast furnaces and getting high yields by using sintered ores. 2. They're still living off big inventories. 3. They don't want to accumulate scrap because of a threatened midyear strike. 4. High (5 per cent) interest rates discourage borrowing. Some observers think prices may stiffen in April.

Chicago—The market continues inactive and weak, but prices are unchanged from a week ago. Despite record steel production and prospects for even higher output in the next few weeks, mills are purchasing scrap sparingly.

Youngstown—A district steelmaker bought No. 1 heavy melting dealer scrap at $46 a ton last week, $2 under its previous purchase, and $2 under the price paid by another producer recently for No. 1 heavy melting industrial material.

Cleveland — Trading in dealer scrap is limited. Tonnage is moving on old orders, but there's little new buying despite high steelmaking operations, here and in the Valley.

Detroit — Area prices have dropped again as dealer transactions remain at a standstill. One Valley mill reportedly entered the market last week for a small tonnage of No. 1 bundles at $36 on track, but the price can't be matched today.

Cincinnati—Prices on the No. 1 grades have weakened another $1 a ton. No. 1 heavy melting is quoted at $37.50-$38.50 by brokers. Principal grades have lost $2 a ton since the mills entered the market early this month. Activity is limited as brokers fill out old orders.

Buffalo—Prices on the principal grades are holding at the level established a week ago when they went down $2 a ton as result of new mill orders.

Birmingham — With northern markets unattractive because of recent price declines, and no indication as to when local buying will improve, scrap dealers are less optimistic than they were.

Houston—Brokers' buying prices, based on a mill order for March shipment, are up $3 for No. 1 and No. 2 heavy melting grades. The mill returned to the market after shipments were completed on a slowly filled February order.

St. Louis—Tonnage began moving last week, resulting in a temporary halt in the price decline. Stocks are plentiful,

San Francisco — Prices on the steel grades of scrap have been raised here. Top grades now are quoted $36 against a previous range of $32-$34. Turnings moved up $1 a ton, now being quoted $16.

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Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including brokers' commission, as reported to STEEL, March 11, 1959. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Mar. 11	$41.66
Mar. 4	42.33
Feb. Avg.	42.58
Mar. 1958	35.83
Mar. 1954	24.37

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	44.00-45.00
No. 2 heavy melting	36.00-37.00
No. 1 dealer bundles	44.00-45.00
No. 2 bundles	30.00-31.00
No. 1 busheling	44.00-45.00
No. 1 factory bundles	52.00-53.00
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*27.00-28.00*
Cast iron borings	*27.00-28.00*
Cut structurals:	
2 ft and under	51.00-52.00
3 ft lengths	50.00-51.00
Heavy turnings	36.00-37.00
Punchings & plate scrap	52.00-53.00
Electric furnace bundles	52.00-53.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Stove plate	41.00-42.00
Unstripped motor blocks	31.00-32.00
Clean auto cast	39.00-40.00
Drop broken machinery	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	47.00-48.00
Rails, 2 ft and under	58.00-59.00
Rails, 18 in. and under	59.00-60.00
Random rails	55.00-56.00
Railroad specialties	52.00-53.00
Angles, splice bars	52.00-53.00
Rails, rerolling	61.00-62.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-230.00
18-8 turnings	120.00-125.00
430 bundles & solids	125.00-130.00
430 turnings	55.00-65.00

CHICAGO

No. 1 hvy melt., indus.	43.00-44.00
No. 1 hvy melt., dealer	41.00-42.00
No. 2 heavy melting	35.00-36.00
No. 1 factory bundles	46.00-47.00
No. 1 dealer bundles	42.00-43.00
No. 2 bundles	28.00-29.00
No. 1 busheling, indus.	43.00-44.00
No. 1 busheling, dealer	41.00-42.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	24.00-25.00
Short shovel turnings	24.00-25.00
Cast iron borings	24.00-25.00
Cut structurals, 3 ft	47.00-48.00
Punchings & plate scrap	48.00-49.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Stove plate	44.00-45.00
Unstripped motor blocks	38.00-39.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	58.00-59.00
Rails, 2 ft and under	57.00-58.00
Rails, 18 in. and under	58.00-59.00
Angles, splice bars	53.00-54.00
Axles	71.00-72.00
Rails, rerolling	62.00-63.00

Stainless Steel Scrap

18-8 bundles & solids	215.00-225.00
18-8 turnings	120.00-125.00
430 bundles & solids	115.00-120.00
430 turnings	55.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*45.00-46.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 busheling	*45.00-46.00*
No. 1 bundles	*45.00-46.00*
No. 2 bundles	*29.00-30.00*
Machine shop turnings	*19.00-20.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Low phos.	*47.00-48.00*
Electric furnace bundles	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*45.00-46.00*

*Nominal

CLEVELAND

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*29.00-30.00*
No. 1 factory bundles	*46.00-47.00*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*28.00-29.00*
No. 1 busheling	*41.00-42.00*
Machine shop turnings	*16.00-17.00*
Short shovel turnings	*22.00-23.00*
Mixed borings, turnings	*22.00-23.00*
Cast iron borings	*22.00-23.00*
Cut foundry steel	*41.00-42.00*
Cut structurals, plates 2 ft and under	*48.00-49.00*
Low phos, punchings & plate	*42.00-43.00*
Alloy free, short shovel turnings	*24.00-25.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	*49.00-50.00*
Charging box cast	*40.00-41.00*
Heavy breakable cast	*40.00-41.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	*35.00-36.00*
Brake shoes	*38.00-39.00*
Clean auto cast	*49.00-50.00*
Burnt cast	*39.00-40.00*
Drop broken machinery	*52.00-53.00*

Railroad Scrap

R.R. malleable	*65.00-66.00*
Rails, 2 ft and under	*59.00-60.00*
Rails, 18 in. and under	*60.00-61.00*
Rails, random lengths	*54.00-55.00*
Cast steel	*48.00-49.00*
Railroad specialties	*52.00-53.00*
Uncut tires	*45.00-46.00*
Angles, splice bars	*53.00-54.00*
Rails, rerolling	*58.00-59.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	215.00-220.00
18-8 turnings	*110.00-115.00*
430 clips, bundles, solids	115.00-125.00
430 turnings	45.00-55.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	36.00
No. 2 heavy melting	34.00
No. 1 bundles	38.00
No. 2 bundles	27.00
No. 1 busheling	38.00
Machine shop turnings	20.00
Short shovel turnings	22.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	40.00
Heavy breakable cast	38.00
Unstripped motor blocks	39.00
Clean auto cast	50.00
Stove plate	45.00

Railroad Scrap

No. 1 R.R. heavy melt.	43.00
Rails, 18 in. and under	53.00
Rails, random lengths	47.50
Rails, rerolling	59.00
Angles, splice bars	49.00

BIRMINGHAM

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	33.00-34.00
No. 2 bundles	*22.00-23.00*
No. 1 busheling	33.00-34.00
Cast iron borings	14.00-15.00
Machine shop turnings	24.00-25.00
Short shovel turnings	25.00-26.00
Bars, crops and plates	*42.0-43.00*
Structurals & plates	*41.00-42.00*
Electric furnace bundles	39.00-40.00
Electric furnace:	
2 ft and under	*38.00-39.00*
3 ft and under	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	53.00-54.00
Stove plate	53.00-54.00
Charging box cast	29.00-30.00
Unstripped motor blocks	40.00-41.00
No. 1 wheels	42.00-43.00

Railroad Scrap

No. 1 R.R. heavy melt	*37.00-38.00*
Rails, 18 in. and under	51.00-52.00
Rails, rerolling	*55.00-56.00*
Rails, random lengths	*43.00-44.00*
Angles, splice bars	44.00-45.00

PHILADELPHIA

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	41.00
No. 2 bundles	*24.00-26.00*
No. 1 busheling	*40.00*
Electric furnace bundles	42.00
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*25.00-27.00*
Machine shop turnings	*21.00-22.00*
Heavy turnings	36.00-37.00
Structurals & plate	44.00-45.00
Couplers, springs, wheels	46.00
Rail crops, 2 ft & under	59.00-60.00

Cast Iron Grades

No. 1 cupola	*41.00*
Heavy breakable cast	43.00
Malleable	68.00
Drop broken machinery	49.00-50.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	28.00-29.00
No. 1 bundles	31.00-32.00
No. 2 bundles	19.00-20.00
Machine shop turnings	12.00-13.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	16.00-17.00
Low phos. (structurals & plates)	*36.00-37.00*

Cast Iron Grades

No. 1 cupola	*36.00-37.00*
Unstripped motor blocks	24.00-25.00
Heavy breakable	*34.00-35.00*

Stainless Steel

18-8 sheets, clips, solids	195.00-200.00
18-8 borings, turnings	85.00-90.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	90.00-95.00

BUFFALO

No. 1 heavy melting	39.00-40.00
No. 2 heavy melting	32.00-33.00
No. 1 bundles	39.00-40.00
No. 2 bundles	27.00-28.00
No. 1 busheling	39.00-40.00
Mixed borings, turnings	20.00-21.00
Machine shop turnings	18.00-19.00
Short shovel turnings	22.00-23.00
Cast iron borings	20.00-21.00
Low phos. structurals and plate, 2 ft and under	47.00-48.00

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	50.00-51.00

Railroad Scrap

Rails, random lengths	49.00-50.00
Rails, 3 ft and under	55.00-56.00
Railroad specialties	48.00-49.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*37.50-38.50*
No. 2 heavy melting	*32.50-33.50*
No. 1 bundles	*37.50-38.50*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*37.50-38.50*
Machine shop turnings	19.00-20.00
Mixed borings, turnings	20.00-21.00
Short shovel turnings	22.00-23.00
Cast iron borings	20.00-21.00
Low phos., 18 in.	47.00-48.00

Cast Iron Grades

No. 1 cupola	45.00-46.00
Heavy breakable cast	40.00-41.00
Charging box cast	38.00-39.00
Drop broken machinery	49.00-50.00

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-44.00*
Rails, 18 in. and under	57.00-58.00
Rails, random lengths	50.00-51.00

HOUSTON

(Brokers' buying prices; f.o.b. cars)

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*35.00*
No. 1 bundles	*38.00*
No. 2 bundles	*23.00†*
Machine shop turnings	17.00
Short shovel turnings	20.00
Low phos. plates & structurals	*43.00*

Cast Iron Grades

No. 1 cupola	43.00
Heavy breakable	27.00-28.00†
Foundry malleable	37.00
Unstripped motor blocks	*35.00*

Railroad Scrap

No. 1 R.R. heavy melt	*38.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	31.00-31.50
No. 2 heavy melting	23.00-23.50
No. 1 bundles	31.00-31.50
No. 1 busheling	31.00-31.50
Machine shop turnings	11.00-11.50
Short shovel turnings	13.00-13.50
No. 1 cast	33.00
Mixed cupola cast	33.00
No. 1 machinery cast	34.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*33.00-34.00*
No. 2 heavy melting	*20.00-21.00*
No. 1 bundles	*34.00-35.00*
No. 2 bundles	*21.00-22.00*
No. 1 busheling	*32.00-33.00*
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	16.00-17.00

Cast Iron Grades

No. 1 cupola	43.00-44.00
Stove plate	32.00-33.00
Charging box cast	33.00-34.00
Heavy breakable	34.00-35.00
Unstripped motor blocks	22.00-23.00
Clean auto cast	47.00-48.00

SEATTLE

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 1 bundles	29.00
No. 2 bundles	23.00
Machine shop turnings	9.00-10.00†
Mixed borings, turnings	9.00-10.00†
Electric furnace No. 1	38.00†

Cast Iron Grades

No. 1 cupola	31.00†
Heavy breakable cast	28.00†
Unstripped motor blocks	23.00†
Stove plate (f.o.b. plant)	21.00†

LOS ANGELES

No. 1 heavy melting	*38.00*
No. 2 heavy melting	*36.00*
No. 1 bundles	*36.00*
No. 2 bundles	*21.00*
Machine shop turnings	*19.00*
Shoveling turnings	*20.00*
Cast iron borings	*20.00*
Cut structurals and plate 1 ft and under	*49.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	47.00

Railroad Scrap

No. 1 R.R. heavy melt.	38.00

SAN FRANCISCO

No. 1 heavy melting	*36.00*
No. 2 heavy melting	*34.00*
No. 1 bundles	*34.00*
No. 2 bundles	22.00
Machine shop turnings	*16.00*
Mixed borings, turnings	*16.00*
Cast iron borings	*16.00*
Heavy turnings	*16.00*
Short shovel turnings	*16.00*
Cut structurals, 3 ft	*42.00*

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices)

No. 1 heavy melting	34.50
No. 2 heavy melting	30.50
No. 1 bundles	34.50
No. 2 bundles	25.00
Mixed steel scrap	26.50
Mixed borings, turnings	15.00
Busheling, new factory:	
Prepared	34.50
Unprepared	28.50
Short steel turnings	19.00

Cast Iron Grades‡

No. 1 machinery cast	45.00

†Nominal.
‡F.o.b. Hamilton, Ont.

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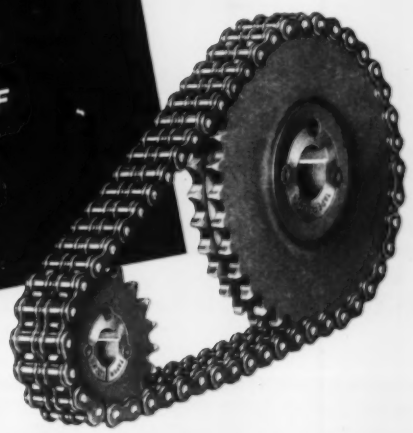

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Price Hikes To Level Off

There will be sporadic adjustments, but don't look for any major changes in the next few weeks. Nonferrous profits were way off last year, statements show

Nonferrous Metal Prices, Pages 170 & 171

IN THE WAKE of the wave of price fluctuations that have flooded the nonferrous market in recent weeks, look for a period of relative calm. Sporadic shifting isn't ruled out, but changes in the next few weeks should be minor unless there's upheaval such as an industrywide labor walkout.

• **Copper Up** — Primary producers took a long look at frantic demand, high prices overseas, and the 2-cent-a-pound differential (compared with custom smelted copper), and boosted their price by 1.5 cents a pound on Mar. 9. At 31.5 cents a pound, primary is the highest it has been since June, 1957, and 2.5 cents more than it was on Jan. 1.

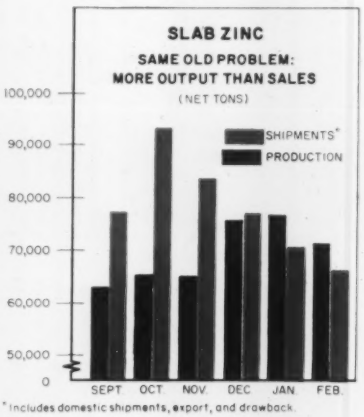
Demand is extremely strong. Users can still get the red metal, but some have trouble buying as much as they want. One thing the hike did was to put the domestic price in parity with foreign quotations, making it uneconomical to ship U. S. copper overseas. But the domestic price is still not high enough to attract foreign copper to the U. S.

Look for the price to hold over the near future, barring labor unrest or some sort of international crisis. Conversely, expect custom smelter quotations to go a little higher. Reason: Demand for their metal exceeds supply.

• **Lead Higher**—In a surprise move, lead prices rose 0.5 cent to 11.5 cents a pound on Mar. 5. Here's what brought about the hike: The overseas quotation fell pretty much into parity with the domestic price of 11 cents. That, plus a generally more bullish market, sent scrap into hiding, so consumers of secondary lead entered the market for virgin metal. At the same time, an extremely large lead user came into the market to cover requirements through the first half.

All those factors touched off a heavy buying wave as users laid in stocks in anticipation of a price rise. Sales have slacked off some since then, but metalmen believe the current price is stable. Don't expect any change for the next few weeks at least.

• **Zinc Stable**—The biggest problem here is too much production (see chart). Output was stepped up during the heavy buying periods of last fall, but shipments haven't held up to that level this year. Result: Stocks are on the increase. They stood at 200,461 tons on Mar. 1. A year ago, they were 189,189 tons.



*Includes domestic shipments, export, and drawback.
Source: American Zinc Institute Inc.

In time the situation could cause price weakness, but it appears to be stable now.

• **Platinum Moving**—Removal of Russian metal from the market and a stepup in world-wide demand continue to exert upward pressures on the price of platinum. Quotations rose $10 an ounce last week and will probably go higher.

Earnings Slump in '58

While fourth quarter business sugared the profit picture considerably, 1958 earnings of most nonferrous metals companies were sharply below those of the previous year. These profit statements will give you an idea of how the industry fared:

Kennecott Copper Corp., $60,121,000, compared with $79,252,000 in 1957; The Anaconda Co., $33,800,000, vs. $44,008,349; Calumet & Hecla Inc., $2,834,885, vs. $1,992,228; and Copper Range Co., $2,588,000, vs. $2,164,979.

St. Joseph Lead Co., $3,986,880, vs. $8,026,273; National Lead Co., $44,721,398, vs. $56,231,560; American Zinc, Lead & Smelting Co., $1,136,797, vs. $1,259,937; and United States Smelting, Refining & Mining Co., a loss of $218,917, vs. a profit of $778,840 in 1957.

Aluminum Co. of America, $42,885,230, vs. $75,568,461; Reynolds Metals Co., $39,184,529, vs. $37,809,712; Kaiser Aluminum & Chemical Corp., $25,232,000, vs. $26,829,000; and Aluminium Ltd., $22,400,000, vs. $41,400,000 in 1957.

NONFERROUS PRICE RECORD

	Price Mar. 11	Last Change	Previous Price	Feb. Avg	Jan. Avg	Mar., 1958 Avg
Aluminum	24.70	Aug. 1, 1958	24.00	24.700	24.700	26.000
Copper	31.50–32.00	Mar. 9, 1959	30.00–32.00	30.159	29.212	24.163
Lead	11.30	Mar. 5, 1959	10.80	11.368	12.415	12.800
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	103.50	Mar. 11, 1959	102.75	102.364	99.409	93.425
Zinc	11.00	Feb. 25, 1959	11.50	11.409	11.500	10.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. shipping point; MAGNESIUM, pig, 99.8%, Velasco, Tex.

Surface systems cut the costs of "fine" carburizing

This manufacturer knows that his Surface carburizing equipment is consistently profitable. His RX® generator gas has a highly uniform analysis. When properly enriched, it gives him the fastest carburizing rate possible. The combination of the most efficient furnace and atmosphere uniformity provide him with maximum carburizing results.

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Surface Combustion Corporation, 2385 Dorr Street, Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

Surface

wherever heat is used in industry

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs 24.70; ingots, 26.80, 30,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.60; No. 43, 28.40; No. 195, 29.40; No. 214, 30.20; No. 356, 28.60; 30 or 40 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 24.50-25.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.45 per lb deld.

Cobalt: 97.99%, $1.75 per lb for 500-lb keg; $1.77 per lb for 100 lb case; $1.82 per lb under 100 lb.

Columbium: Powder, $55-85 per lb, nom.

Copper: Electrolytic, 31.50 deld.; custom smelters, 32.00; lake, 31.50 deld.; fire refined, 31.25 deld.

Germanium: First reduction, less than 1 kg, 41.00 per gram; 1-10 kg, 37.00 per gram; intrinsic grade, 35.00-37.00 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $75-80 nom. per troy oz.

Lead: Common, 11.30; chemical, 11.40; corroding, 11.40, St. Louis. New York basis, add 0.20.

Lithium: Cups or ingots, 50-100 lb, $10 per lb; f.o.b. Minneapolis; 100-500 lb, $9.50 per lb deld.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, 9Z91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $218-221 per 76 lb flask.

Molybdenum: Unalloyed, turned extrusion, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel, 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. points of entry, contained nickel, 69.60.

Osmium: $70-100 per troy oz nom.

Palladium: $18-20 per troy oz.

Platinum: $77-80 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $122-125 per troy oz.

Ruthenium: $55-60 per troy oz.

Selenium: $7.00 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car, 17.00.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $7.50 per lb.

Tin: Straits, N. Y. spot and prompt, 103.50.

Titanium: Sponge, 99.3 + % grade A-1, ductile (0.3% Fe max.), $1.62-1.82; grade A-2 (0.5% Fe max.), $1.70 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $3.30-3.80.

Zinc: Prime Western, 11.00; brass special, 11.25; intermediate, 11.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 12.00; special high grade, 12.25 deld. Diecasting alloy ingot No. 3, 13.50; No. 2, 14.00; No. 5, 13.75 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $7 per lb; 100-500 lb, $6.50 per lb; over 500 lb, $6 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.875-25.25; No. 12 foundry alloy (No. 2 grade), 21.75-22.00; 5% silicon alloy, 0.60 Cu max., 24.75-25.00; 13 alloy, 0.60 Cu max., 24.75-25.00; 195 alloy, 25.25-26.00; 108 alloy, 22.25-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.50; grade 3, 21.25; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 30.75; tin bronze, No. 225, 41.25; No. 245, 35.00; high-leaded tin bronze, No. 305, 35.00; No. 1 yellow No. 405, 25.00; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.89, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 36.855; l.c.l., 37.48. Weatherproof, 20,000-lb lots, 37.42; l.c.l., 38.17.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.00 per cwt; pipe, full coils, $17.00 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $7.50-17.00; sheared mill plate, $5.25-10.00; wire, $5.75-10.00; forging billets, $3.55-5.75; hot-rolled and forged bars, $4.25-7.50.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 26.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100, 3003 and 5005 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.250-0.136	42.80-47.30	.....
0.136-0.096	43.20-48.30	.....
0.126-0.103	.....	39.20-39.80
0.096-0.077	43.80-50.00	39.30-40.00
0.077-0.068	44.30-52.20	.....
0.077-0.061	.....	39.50-40.70
0.068-0.061	44.30-52.20	.....
0.061-0.048	44.90-54.40	40.10-41.80
0.048-0.038	45.40-57.10	40.60-43.20
0.038-0.030	45.70-62.00	41.00-45.70
0.030-0.024	46.20-53.70	41.30-45.70
0.024-0.019	46.90-56.80	42.40-44.10
0.019-0.017	47.70-54.10	43.00-44.70
0.017-0.015	48.60-55.00	43.80-45.50
0.015-0.014	49.60	44.80-46.50
0.014-0.012	50.80	45.50
0.012-0.011	51.00	46.70
0.011-0.0095	53.50	48.10
0.0095-0.0085	54.60	49.60
0.0085-0.0075	56.20	50.80
0.0075-0.007	57.70	52.30
0.007-0.006	59.30	53.70

ALUMINUM (continued)

Plates and Circle: Thickness 0.250-3 in. 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.40	47.20
5050-F	43.50	48.30
3004-F	44.50	50.20
5052-F	45.10	50.90
6061-T6	45.60	51.70
2024-T4	49.30	56.10
7075-T6*	57.60	64.70

*24-48 in. width or diam., 72-180 in. lengths

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats*	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
0.125	76.90	73.90	....	....
0.250	62.00	60.20	89.10	76.60
0.375	61.20	60.00	73.50	68.50
0.500	61.20	60.00	73.50	68.50
0.625	61.20	60.00	69.80	64.20
0.750	59.70	58.40	63.60	60.40
0.875	59.70	58.40	63.60	60.40
1.000	59.70	58.40	63.60	60.40
1.125	57.30	56.10	61.50	58.30
1.250	57.30	56.10	61.50	58.30
1.350	57.30	56.10	61.50	58.30
1.500	57.30	56.10	61.50	58.30
1.625	55.00	53.60	....	56.20
1.750	55.00	53.60	60.30	56.20
1.875	55.00	53.60	....	56.20
2.000	55.00	53.60	60.30	56.20
2.125	53.50	52.10	....	....
2.250	53.50	52.10	....	56.20
2.375	53.50	52.10	....	....
2.500	53.50	52.10	....	56.20
2.625	....	50.40	....	....
2.750	51.90	50.40	....	56.20
2.875	....	50.40	....	....
3.000	51.90	50.40	....	56.20
3.125	....	50.40	....	....
3.250	....	50.40	....	....
3.375	....	50.40	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam, 0.375-8 in., "F" temper; 2014, 42.20-55.00; 6061, 41.60-55.00; 7075, 61.60-75.00; 7070, 66.60-80.00.

Pipe: ASA schedule 40, alloy 6063-T6 standard length, plain ends, 90,000 lb base, dollars per 100 ft. Nominal pipe sizes: ⅜ in., 18.85; 1 in., 29.75; 1¼ in., 40.30; 1½ in., 48.15; 2 in., 58.30; 4 in., 160.20; 6 in., 287.55; 8 in., 432.70.

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	42.70-44.20	51.30-55.50
12-14	42.70-44.20	52.00-56.50
15-17	42.70-44.20	53.20-58.20
18-20	43.20-44.70	55.20-60.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103 10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24-72 in. widths: .125 in., 74.90; .188 in., 71.70-72.10; .25-.75 in., 70.60-71.60. Tooling plate, .25-30 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York in ton lots.)

Copper and Brass: No. 1 heavy copper and wire, 25.75-26.25; No. 2 heavy copper and wire, 23.75-24.25; light copper, 21.75-22.25; No. 1 composition red brass, 19.25-19.75; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	55.63b	52.86c	....	55.82
Yellow Brass	48.24	32.73d	48.78	51.65
Low Brass, 80%	51.23	51.17	51.77	54.54
Red Brass, 85%	52.29	52.23	52.83	55.60
Com. Bronze, 90%	53.90	53.84	54.44	56.96
Manganese Bronze	56.54	50.14	60.62	....
Muntz Metal	50.85	46.16	....	....
Naval Brass	52.80	46.61	59.36	56.21
Silicon Bronze	60.67	59.86	60.21	78.35
Nickel Silver, 10%	63.82	66.15	....	....
Phos. Bronze	75.34	75.84	75.84	77.02

SCRAP ALLOWANCES e (Based on copper at 31.50c)

	Clean Heavy	Rod Ends	Clean Turnings
Copper	27.500	27.500	26.750
Yellow Brass	20.625	19.750	18.750
Low Brass, 80%	23.250	23.000	22.500
Red Brass, 85%	24.250	24.000	23.500
Com. Bronze, 90%	25.125	24.875	24.375
Manganese Bronze	19.125	18.875	18.375
Muntz Metal	19.375	19.125	18.625
Naval Brass	19.125	18.875	18.375
Silicon Bronze	27.000	26.750	26.000
Nickel Silver, 10%	25.500	25.250	12.625
Phos. Bronze	28.625	28.375	25.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 18.25-18.75; new brass clippings, 16.75-17.25; light brass, 13.00-13.25; heavy yellow brass, 14.00-14.50; new brass rod ends, 14.50-15.00; auto radiators, unsweated, 15.25-15.75; cocks and faucets, 15.50-16.00; brass pipe, 16.00-16.50.

Lead: Heavy, 7.50-7.75; battery plates, 3.25-3.50; linotype and stereotype, 8.75-9.25; electrotype, 7.25-7.75; mixed babbitt, 8.75-9.25.

Monel: Clippings, 26.00-28.00; old sheets, 23.00-25.00; turnings, 20.00-21.00; rods, 26.00-28.00.

Nickel: Sheets and clips, 52.00-54.00; rolled anodes, 52.00-54.00; turnings, 38.00-40.00; rod ends, 52.00-54.00.

Zinc: Old zinc, 3.00-3.25; new diecast scrap, 3.00-3.25; old diecast scrap, 1.50-1.75.

Aluminum: Old castings and sheets, 10.00-10.50; clean borings and turnings, 6.50-7.00; segregated low copper clips, 13.25-13.75; segregated high copper clips, 13.25-13.75; mixed low copper clips, 12.25-12.75; mixed high copper clips, 11.25-11.75.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.75-12.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 16.75-17.25; segregated high copper clips, 15.75-16.25; mixed low copper clips, 16.00-16.50; mixed high copper clips, 15.25-15.75.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.50-15.00; segregated high copper clips, 13.00-13.50; mixed low copper clips, 13.50-14.00; mixed high copper clips, 12.50-13.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 57.50; light scrap, 52.50; turnings and borings, 37.50.

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.50; light copper, 24.25; refinery brass (60% copper) per dry copper content, 25.75.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 28.00; No. 2 heavy copper and wire, 26.50; light copper, 24.25; No. 1 composition borings, 22.00; No. 1 composition solids, 22.50; heavy yellow brass solids, 16.00; yellow brass turnings, 15.00; radiators, 17.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.45.

Copper: Flat-rolled, 47.79; oval, 46.00, 5000-10,000 lb; electrodeposited, 40.50, 2000-5000 lb lots; cast, 43.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 18.00; flat tops, 18.00; flats, 20.75; ovals, 20.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.45 per lb in 100-lb drums.

Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.

Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,900 lb, 61.90.

Copper Sulphate: 100-1900 lb, 15.30; 2000-5900 lb, 13.30; 6000-11,900 lb, 13.05; 12,000-22,900 lb, 12.80; 23,000 lb or more, 12.30.

Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.

Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,990 lb, 28.50; 40,000 lb or more, 28.00.

Sodium Cyanide (Cyanobrik): 200 lb, 20.80; 400-800 lb, 19.80; 1000-19,800 lb, 18.80; 20,000 lb or more, 17.80.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (Anhydrous): 25 lb, 155.60; 100 lb, 150.70; 400 lb, 148.30; 800-19,900 lb, 107.40; 20,000 lb or more, 101.30.

Stannous Sulphate: Less than 50 lb, 140.70; 50 lb, 110.70; 100-1900 lb, 108.70; 2000 lb or more, 106.70.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Armco Is Testing New Enameling Iron

Armco Steel Corp., Middletown, Ohio, is field testing its new "Univit" enameling iron, which is believed to have potentially wide application in appliances and other consumer goods items. The company says it eliminates the ground coating of frit. One coat serves as the final application.

The product is being produced in experimental quantities at a pilot plant in Middletown. Price: $1 premium per 100 lb over the regular grade enameling iron.

Pig Iron . . .

Pig Iron Prices, Page 160

Merchant iron buyers are beginning to push for more tonnage. Sellers say demand is up 40 per cent from that in November. In the Midwest, the increase is even greater.

Consumers are becoming inventory conscious, the biggest push for tonnage coming from automotive and the farm equipment industries.

Chicago area gray iron jobbing foundries are working 40 to 48 hours a week. The average is 41 hours. A year ago, these plants were operating 24 to 40 hours (average, 32). Closed by strikes are the foundries of Allis-Chalmers and Oliver Corp.

Engaged gray iron jobbing foundry capacity ranges from 65 to 90 per cent (average, 77 per cent). A year ago, the shops were engaged from 30 to 70 per cent (average, 59 per cent).

Gray iron order backlogs now range from three to ten weeks, with the average a little over five weeks. A year ago, they ranged two to three weeks, averaging two weeks.

CLASSIFIED ADVERTISING

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Tool and Die Engineer—Master Mechanic or thoroughly experienced Tool and Die Maker with lay-out and design experience to manage our Metal Production Branch in Camden County, New Jersey. Duties include office administration to assure perfect accurate and perpetuated control. Reply Box 742, STEEL, Penton Bldg., Cleveland 13, Ohio.

Ceramic Engineer—Research and Development work in refractories industry; 5-10 years experience in refractories manufacturing and/or research or similar refractories experience in steel industry. Previous supervisory experience desirable. Send resume to Box 743, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

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20 years steel production experience. Electric Melt Shop; Pits; Blooming Mill; Strip, Bar and Rod Mills. Finishing, Shipping, Programming. Quality Control. Costs. Proven ability to Organize and direct production. Reply **Box 740, STEEL, Penton Bldg., Cleveland 13, Ohio.**

MECHANICAL ENGINEER, 20 years experience plant layout, design, project planning, specifications, and estimating. Desires heavier responsibilities at plant level. Midwest or far west. Subscribes to policy of full cooperation with operating people. Appropriate principal responses acknowledged. Reply Box 744, STEEL, Penton Bldg., Cleveland 13, Ohio.

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STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3000 tons, state hospital, Bronx, N. Y., through Depot Construction Co., general contractor, to Lehigh Structural Steel Co., Allentown, Pa.

1685 tons, two hangars, Andrews Air Force Base, Maryland, through F. E. Rich Co. Inc., to Richmond Steel Co. Inc., Richmond, Va.

1540 tons, coal unloading equipment, Public Service Electric & Gas Co., Duck Island, N. J., to Ingalls Iron Works, Birmingham.

1500 tons, powerplant extension, Harbor Station No. 2, United Illuminating Co., Bridgeport, Conn., to Pittsburgh Bridge & Iron Co., Pittsburgh.

1150 tons, Idaho state underpass, Pocatello, to Bethlehem Pacific Coast Steel Corp., Seattle; Pickett & Nelson, Pocatello, general contractor.

1000 tons, state highway structures, Route 95E, Fall River-New Bedford-Providence Expressway, Rehoboth and Swansea, Mass., to Tower Iron Works, Providence, R. I.; General Engineering Co., subcontractor for bridges; M. A. Gammino Construction Co., Providence, general contractor.

900 tons, penstocks, Stuscarora powerplant, Lewiston, N. Y., for the New York State Power Authority, to Chicago Bridge & Iron Co., Chicago.

800 tons, superstructure, bascule bridge, Granite Avenue, Boston-Milton, Mass., to Builders' Iron Works, Somerville, Mass.

600 tons, column cores, School of Technology, City College of New York, New York, through Frouge Construction Co., general contractor, to Elizabeth Iron Works Inc., Union, N. J.

600 tons, Maryland state bridge, over Baltimore & Ohio Railroad tracks near Washington, to Ingalls Iron Works, Birmingham.

600 tons, New York state bridge, Verona, N. Y., through C. D. Perry & Sons, Troy, N. Y., general contractor, to Ingalls Iron Works, Birmingham.

545 tons, three-span girder and rolled beam bridge, Ansonia, Conn., to American Bridge Div., U. S. Steel Corp., Pittsburgh; Mariani Construction Co., New Haven, Conn., general contractor.

415 tons, port facilities, Anchorage, Alaska, to Kaiser Steel Corp., Fontana, Calif.; also, 1736 tons of 24 and 42 in. pipe.

360 tons, state highway bridge, Suffolk County, N. Y., to City Iron Works, Wethersfield, Conn.; Rapone Co., New York, general contractor.

350 tons, registrar building, New Haven, Conn. to New England Iron Works, New Haven, Conn.; Dwight Building Co., general contractor.

180 tons, transmission towers, Connecticut Light & Power Co., Norwalk, Conn., to Morris Iron & Wire Works, Bridgeport, Conn.

115 tons, state highway bridge, Thomaston, Conn., to City Iron Works, Wethersfield, Conn.; A. E. Williams Co., general contractor.

105 tons, state bridgework, Greene County, N. Y., through the Sea-Craft Construction Co., general contractor, to James McKinney & Son Inc.

STRUCTURAL STEEL PENDING

1200 tons, seven highway bridges, Chelmsford-Westford-Tynesboro, Mass.; M. A. Gammino Construction Co. Inc., Providence, R. I., low on the general contract.

760 tons, three state highway bridges, Chelmsford, Mass.; Henly-Lundgren Co., Shrewsbury, Mass., is low on the general contract.

100 tons or more nine intake gates and equipment, Ice Harbor Dam; bids April 14 to U. S. Engineer, Walla Walla, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Missouri-Kansas-Texas Railroad, 25 bulk end flatcars, to Thrall Car Co., East Chicago, Ind.

Inland Steel Co., East Chicago, Ind., 30 hopercars to Thrall Car Mfg. Co., Chicago Heights, Ill.

Inland Steel Co., East Chicago, Ind., 16 flue dust cars to United States Railway Equipment Co., Blue Island, Ill.

QUANTITY PRODUCTION OF GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
CHATTANOOGA 2, TENN.

WARD STEEL CO.

We specialize in
FINISHED STEEL
BARS—TUBES—STRIP

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of
BLUE TEMPERED SPRING STEEL

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CAMBRIDGE 40, MASS.

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Phone: Grovehill 6-2600

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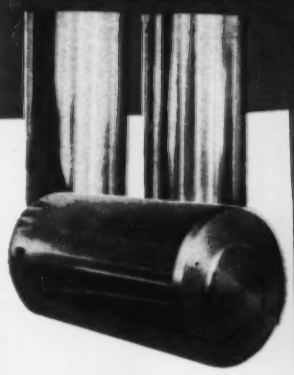
RED CIRCLE Rolls ALLOY-CHILLED

Hyde Park RAMS



for all types of HYDRAULIC EQUIPMENT

Hyde Park Rams are available in Chilled or Alloy Iron.

Furnished in hardness range to meet your specification . . . ground to your required size.

On your next replacement of Rams—or for new equipment—consult us. Our engineers will be glad to assist you.

Red Circle Rolls for every Purpose

Rolling Mill Equipment

Gray Iron Castings up to 80,000 lb.

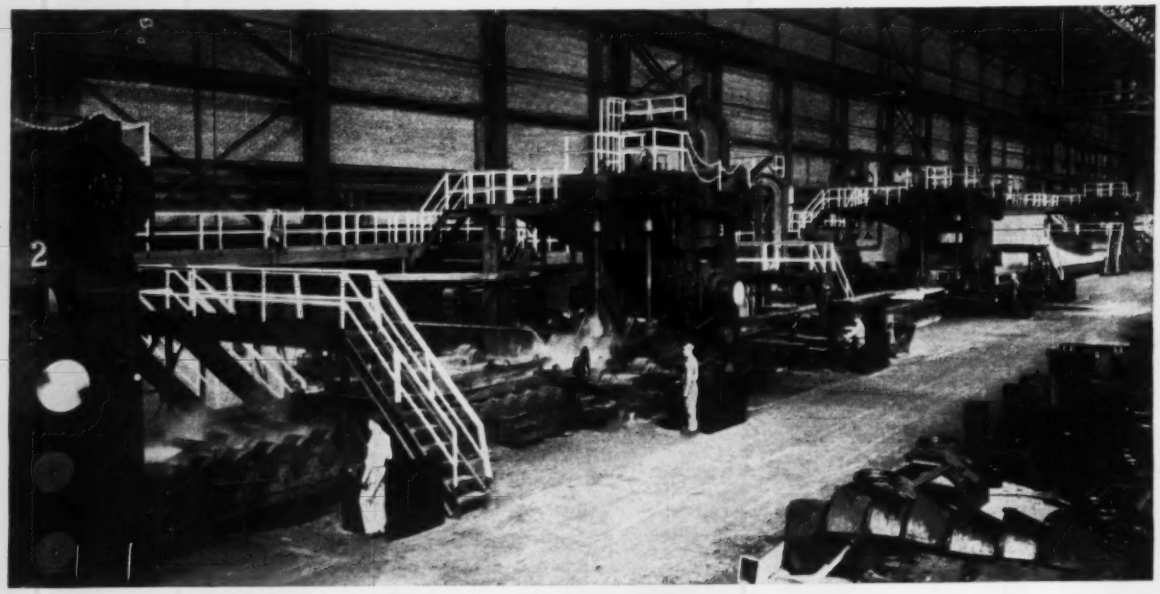
Hyde Park

FOUNDRY and MACHINE CO.

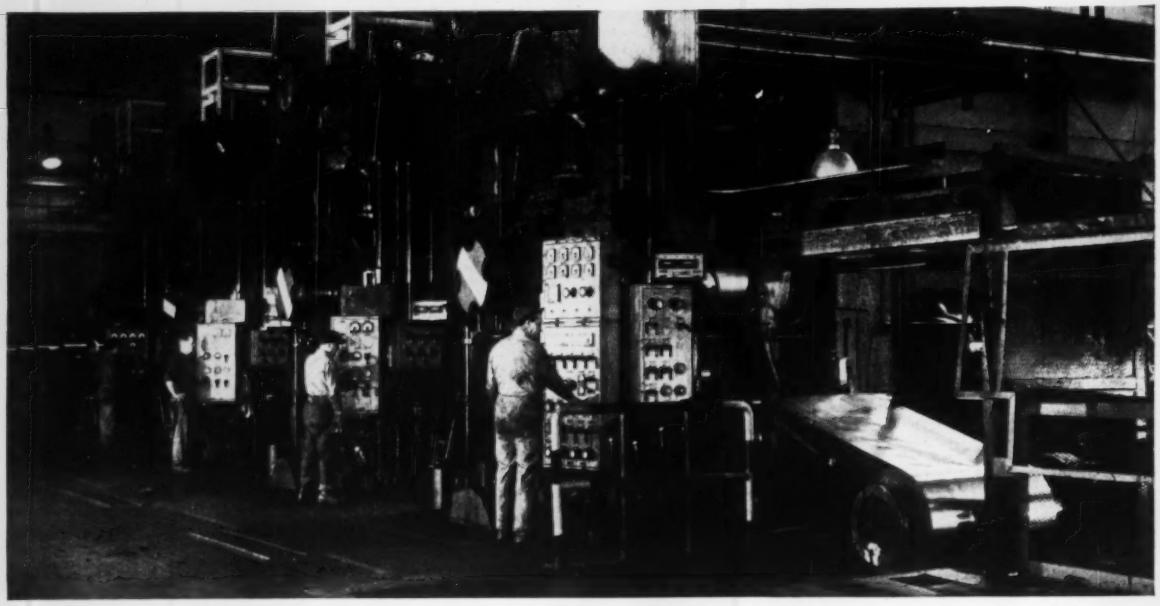
HYDE PARK

Westmoreland County, Pa.

Rolls
Rolling Mill Equipment
Gray Iron Castings



On these giant sheet mills we measure in 000ths



Shown at the top is the 68-in. continuous hot mill at our Sparrows Point, Md., plant. Entering this mill as slabs several inches thick, hot steel whizzes through at ever-increasing speeds until it emerges as hot-rolled sheet at speeds up to 2120 ft per min. The finest hot-rolled sheet steel you can buy!

Some of this hot-rolled steel is further reduced cold at still higher speeds for use in automobile body stampings and a host of other applications. Typical of Bethlehem's up-to-the-minute facilities is the 54-inch cold mill at our Lackawanna, N. Y., plant (lower photo).

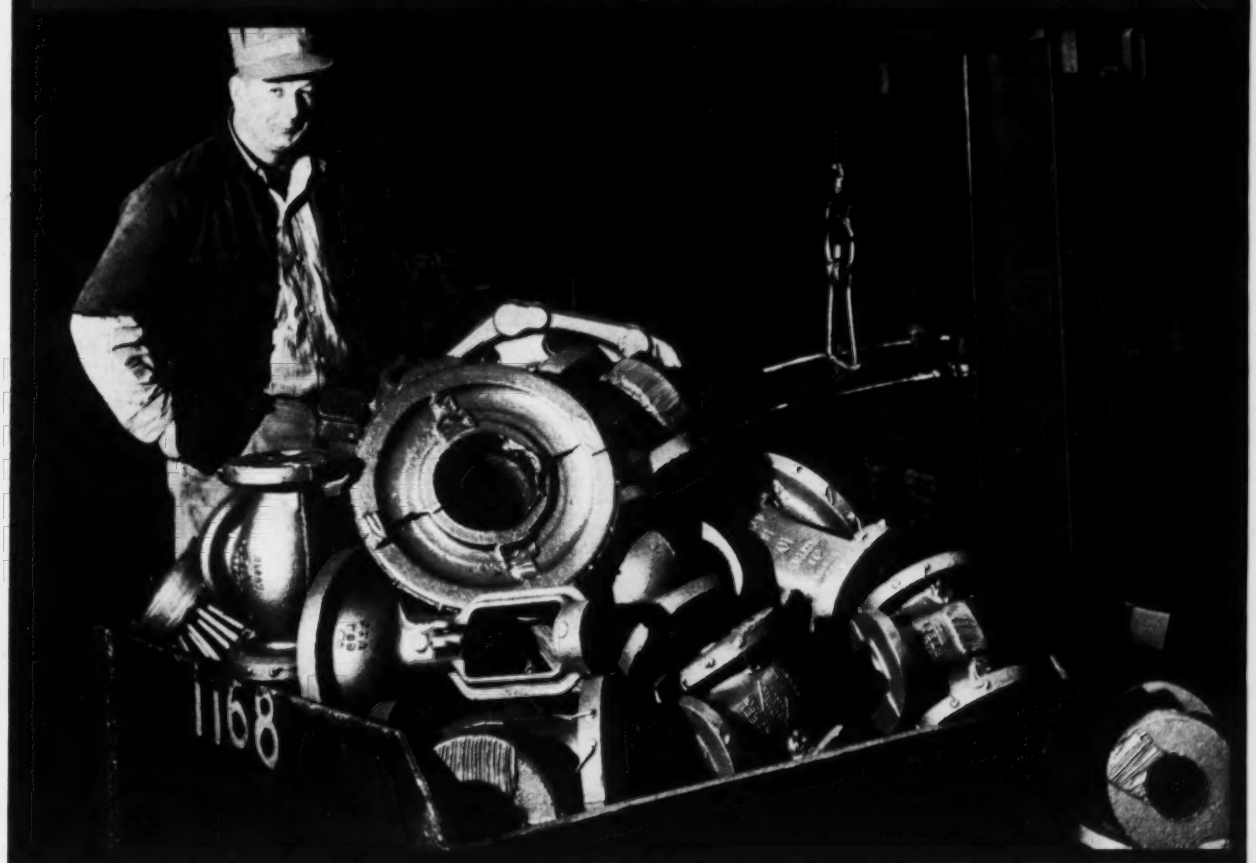
Massive though these mills are, experienced operators control thickness tolerances within a very few thousandths of an inch! And all along the line, Bethlehem sheets are carefully checked to insure uniformity of gage, surface, weight and mechanical properties.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

ROTOBLAST® STEEL SHOT CUTS COSTS 37%



Rotoblast Steel Shot reduces abrasive consumption 37% at Ft. Pitt

Ft. Pitt Steel Castings Div., Pittsburgh Steel Foundry Corp., McKeesport, Pa., really put Pangborn's New Rotoblast Steel Shot to the test! Ft. Pitt ran a careful six months study using S-460—involving hundreds of hours of operation—comparing Rotoblast to the best steel shot the company had found previously. Both abrasives were tested under the same conditions in a 72 cu. ft. Rotoblast Barrel.

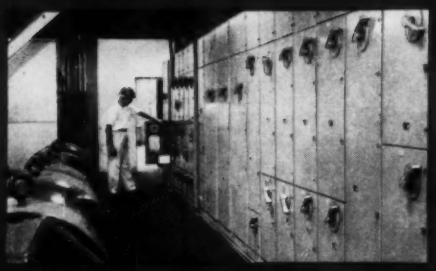
The result: The consumption of Rotoblast Steel Shot ran 37% *below* the other abrasive. Since cost-per-ton is approximately the same for both abrasives, Rotoblast Steel Shot has cut Ft. Pitt abrasive costs by more than ⅓!

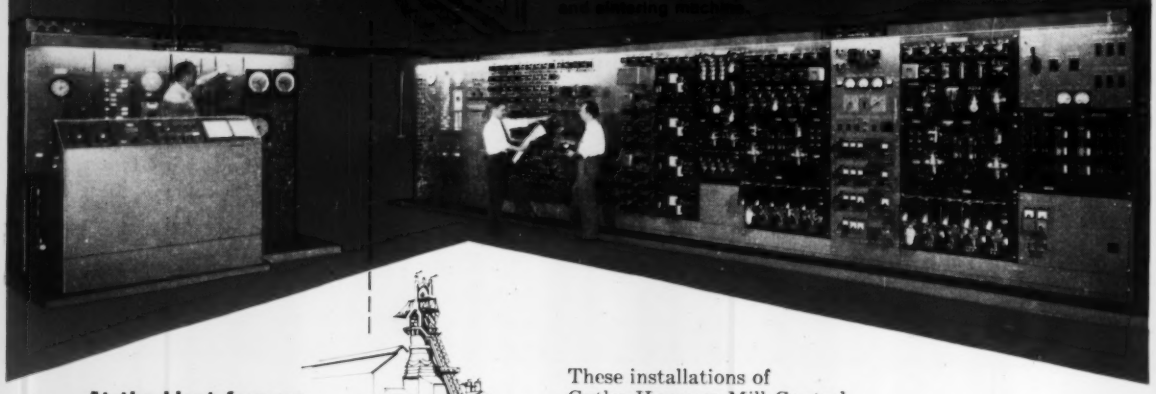
The durability of Rotoblast Steel Shot is due to its unique method of manufacture. The Pangborn man in your area can tell you about it. Or write PANGBORN CORP., 1600 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Blast Cleaning and Dust Control Equipment, Rotoblast Steel Shot and Grit.*

Pangborn **ROTOBLAST STEEL SHOT AND GRIT**

From iron ore to iron

Cutler-Hammer Control sets the pace at USS Fairless Works





At the blast furnace—

The new automatic blast furnace charging system is another joint development of Arthur G. McKee and Cutler-Hammer. This revolutionary system completely integrates the proper proportioning and charging of the furnace to follow a pre-selected schedule. Extensive use of visual signals provides a continuous check on the position of the skip cars, number of load on the small and large bells, stock rod position, top temperature and pressure.

These installations of Cutler-Hammer Mill Control quickly demonstrate the very broad experience and engineering knowledge available to you in the solution of your mill control problems. Write today describing your particular requirements . . . your letter will receive prompt attention. Dept. F213, Cutler-Hammer Inc., Milwaukee 1, Wisconsin.

CUTLER-HAMMER CONTROL C-111

Look to Cutler-Hammer mill experience . . . as broad as it is long

CUTLER-HAMMER

Cutler-Hammer Inc., Milwaukee, Wis. • *Division:* **Airborne Instruments Laboratory.** • *Subsidiary:* **Cutler-Hammer International, C. A.**

Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.; Intercontinental Electronics Corporation